A Review of 2002 / 2003 British Columbia Herring Fisheries

B. Rusch, S. MacConnachie, and L. Hamer

Fisheries and Oceans Canada
South Coast Area
3225 Stephenson Point Road
Nanaimo, British Columbia
V9T 1K3

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ABSTRACT

Rusch B., S. MacConnachie, and L. Hamer. 2003. A review of 2002 / 2003 British Columbia herring fisheries. Can. Ind. Rep. Fish. Aquat. Sci. 273: vi + 63 p

The Pelagic Subcommittee of the Pacific Scientific Advice Review Committee (PSARC) recommended a biological yield of 47,829 tons for five major British Columbia herring stock assessment regions in 2003. Whole herring and / or herring spawn was harvested in the following fisheries: food, social and ceremonial; roe; spawn on kelp; winter food and bait; commercial, sport, personal use bait; charity sales; zoo and aquarium food; test fishing; and research. The 2003 coast wide roe herring quota was 27,800 tons, and 29,393 tons were caught.

RÉSUMÉ

Rusch B., S. MacConnachie, and L. Hamer. 2003. A review of 2002 / 2003 British Columbia herring fisheries. Can. Ind. Rep. Fish. Aquat. Sci. 273: vi + 63 p

Le sous-comité pour la pêche pélagique du Comité d'examen des évaluations scientifiques du Pacifique (PSARC) a recommandé d'établir à 47,829 tonnes la productivité de cinq grandes régions de pêche au hareng de la Colombie-Britannique en 2003. Des harengs et/ou des oeufs de harengs ont été récoltés dans les secteurs de pêche suivants : pêche autochtone à buts alimentaire, social et cérémoniel; pêche des oeufs de hareng; pêche des oeufs de hareng sur varech; pêche minotière et pour les appâts; pêche commerciale, pêche sportive, pêche pour appâts à usage personnel; ventes à but caritatif; alimentation des animaux captifs (zoos et aquariums); pêche exploratoire et recherche. Le quota pancôtier de pêche au hareng rogué pour 2003 était de 27,800 tonnes, et 29,393 tonnes ont été capturées.

104-02021/

1.0 INTRODUCTION

Herring have been one of the most important components of British Columbia commercial fisheries over the past century, with catch records dating from 1877. The fishery has evolved from a dry salted product in the early 1900's, to a reduction fishery in the 1930's, to the current roe fishery that began in 1972. In addition to the roe fishery, whole herring and / or herring spawn is harvested in the following fisheries: food, social and ceremonial; spawn on kelp; winter food and bait; commercial, sport, and personal use bait; charity sales; zoo and aquarium food; test fishing and research.

In this report, we briefly summarise stock assessment results and forecasts, and document allocations to all 2002 / 2003 herring fisheries. Management structures of the various herring fisheries are described, and catch information is presented. Sections detailing the dates and locations for roe herring fisheries, winter food and bait fisheries, and test fisheries are also included. Additionally, the 2003 spawn report, including dates, lengths, and widths of known spawning by location and statistical area are presented.

2.0. STOCK ASSESSMENT

Planning for herring fisheries traditionally begins in the summer with a review of herring stock assessment information by the Pelagic Subcommittee of the Pacific Scientific Advice Review Committee (PSARC). The Pelagic Subcommittee is made up of herring research staff from the Stock Assessment Division at the Pacific Biological Station, and herring fishery managers from the Resource Management branch. Additional participants in the September 4-6 2002 Pelagic Subcommittee meeting included representatives from five First Nations; the Herring Conservation & Research Society (HCRS); Spawn on Kelp Operators Association (SOKOA); the Sierra Club of B.C; the Fishing Vessels Owners Association (FVOA) and industry representatives. At this meeting, an assessment of the 2002 herring abundance was made, and abundance for 2003 was forecast (Table 1) for the five major stock assessment regions (Figure 1).

Herring stock assessments in 2003 were made using the age-structured model (RASM-2q) (Schweigert 2002). The model uses the available 52-year time series of catch, spawn, weight-at-age, and age-structure information. The estimated spawning escapement in each assessment region is used to forecast abundance for the next fishing season by applying average growth and survival rates to estimate the biomass of returning adults. Forecast biomass is calculated as the total of repeat spawners, plus new "recruits" (i.e. first time spawners). Three alternative stock forecasts are generated for the coming year from the model using averages of the third poorest, middle third and third best of the historically observed recruitment to provide estimates of "poor", "average" and "good" recruitment assumptions. In general, the average recruitment forecast is adopted for the coming season unless ancillary information is available to indicate recruitment will be better or poorer than average.

The five major British Columbia herring stock assessment regions (Figure 1) are currently managed by a fixed harvest rate strategy in conjunction with fishing thresholds or "Cut-off" levels for each region. Recommended yields are set at 20 percent of the forecast biomass for each of the major assessment regions, provided the recommended yield does not reduce the biomass below the Cut-off. The 20 percent harvest rate is considered to represent a conservative level of re novals given the biological productivity of the major herring stocks (Schweigert and Ware,

1995). Cut-off levels are set at 25 percent of the estimated unfished average biomass, as determined by simulation analyses. As the forecast abundance approaches the Cut-off level, the recommended yield is calculated as Catch = Forecast Run – Cut-off. When the forecast falls below the Cut-off, a decision may be made to close the region to commercial fishing.

2.1. Recommended Yield for 2003

The forecast biomass for 2003 for the five major stock assessment regions totalled 224,160 tonnes, or 247,094 tons[1] (Schweigert, 2002). The Pelagic Subcommittee of PSARC reviewed the forecast, and recommended a biological yield of 47,829 tons for 2003 (PSARC, 2002). This represents a 9 percent increase from the total recommended yield of 42,934 tons in 2002.

The RASM-2q forecast of 2003 biomass was used in all areas. The recruitment assumption, corresponding 2003 pre-fishery biomass forecast, and the recommended yields for each of the major stock regions are summarised in Table 1.

In the Queen Charlotte Islands, an average recruitment option was adopted for 2003. The pre-fishery biomass forecast was 7,937 tons, assuming average recruitment, which would result in no recommended harvest for the QCI area.

An average recruitment option was adopted in the Prince Rupert District. The pre-fishery biomass forecast for 2003 was 34,900 tons, resulting in a potential harvest of 6,977 tons.

An average recruitment option was also used in the Central Coast, resulting in a pre-fishery biomass forecast of 27,844 tons. Application of the 20 percent harvest rate resulted in a recommended yield of 5,567 tons.

In the St. of Georgia, a good recruitment assumption was adopted, resulting in a 2003 forecast pre-fishery biomass of 143,311 tons, which allowed for a potential harvest of 28,660 tons.

Results from the 2002 offshore research cruise indicated that a poor recruitment forecast should be adopted for the WCVI area in 2003. This resulted in a forecast pre-fishery biomass of 33,102 tons allowing for a potential harvest of 6,625 tons. The Subcommittee recommended the use of caution when setting 2003 harvest levels due to the rebuilding nature of stocks in this area.

The Subcommittee recommend a harvest of 94 tons for Area 27, based on an estimated spawning biomass of 939 tons in 2003. (For minor stocks, the yield is calculated as 10 percent of the assessed 2002 abundance.) Based on the limited spawn assessment in Area 2W, the subcommittee recommended a harvest of 14 tons.

3.0. MANAGEMENT PLANNING PROCESS

Operational planning for the 2003 herring roe fishery and other herring fisheries began in September with bilateral meetings with First Nations and local communities. At these meetings,

[1] Traditionally, all estimates and forecasts listed in PSARC documents are in metric tonnes. "Short tons" (i.e. 2000 pound tons) are the measurement unit of choice for the Herring Technical Working Group, Herring Industry Advisory Board, and Industry in general. For the sake of consistency throughout this document, all weights given will be in tons.

current herring stock status information and yield recommendations for 2003 were presented. Attendees were provided the opportunity to comment and advise on any issue pertaining to herring resource management in their local area. Stakeholder comments and advice obtained from these meetings were carried forward to regional advisory sessions, including the Herring Technical Working Group (HTWG) and the Herring Industry Advisory Board (HIAB) meetings, held in late September and early October.

The HTWG is made up of departmental staff augmented by a limited number of First Nations, commercial fishing industry representatives, and a representative from the BC Ministry of Fisheries. At the September meeting of the HTWG, the expected herring utilisation for all non-roe herring fisheries was accounted for in an "expected use table" (Table 2). The remaining herring total allowable catch (TAC) in each of the five stock regions was then allocated to the roe fishery. The resulting roe fishery catch allocations were used in the development of a series of preliminary coastwide harvest options. In developing roe fishery options, consideration was given to advice provided by First Nations and other members of the public in prior advisory sessions. The committee also prepared recommendations for roe fishery management strategies and reviewed plans for the herring test fishery program.

All recommended management options and strategies were carried forward to subsequent meetings of the HIAB. This committee is made up of participants from twelve organisations representing all sectors of the herring fishing industry. Representatives from coastal First Nations also participated in the 2002 HIAB meetings. HIAB was tasked with developing a recommended coast-wide roe fishery option and to advise the Fisheries and Oceans Canada (DFO) on specific fishery management issues. There were two HIAB meetings held in the fall of 2002. The first meeting in late September was primarily an information session in which stock status information, roe options, and management recommendations from the HTWG were presented. Stakeholder participants were then provided a period of several weeks to consult with their constituents before reconvening at the second meeting, held in the latter part of October. At the final HIAB meeting, fishing industry and First Nation representatives shared their perspectives regarding a potential roe fishery plan for 2003. HIAB members then developed a recommended coast-wide roe fishery option for 2003, which attempted to address both the commercial fishing industry and First Nation perspectives in each stock region.

Following the HIAB meetings, draft Roe Herring and Spawn on Kelp Integrated Fisheries Management Plans were distributed to interested stakeholders and all coastal First Nations (FN) for review and comment. The management plans were finalised and carried through a regional and national review process, for approval by the Minister of Fisheries and Oceans.

A final HIAB meeting was held in April of 2003 to carry out a post-season review of the 2002 / 2003 herring fisheries.

4.0. EXPECTED USE

Expected herring use for all 2003 herring fisheries is recorded in Table 2. Expected use assignments for food, social and ceremonial uses are made first followed by expected use for other commercial fisheries and test fisheries. The roe fishery receives the available balance after other assignments are satisfied. Allotments to 'non-roe' fisheries were as follows: food, social, and ceremonial fisheries – 1,535 tons; spawn on kelp – 3,000 tons (plus and additional 375 tons

from minor areas); commercial communal fishery - 525 tons; winter food and bait fishery (including sport, commercial, and personal use bait, as well as Walcan and Fjord permits) –1,875 tons; charity sales - 275 tons; zoo and aquarium food - 110 tons; and Herring Conservation & Research Society (HCRS) for test fishing and research – 2,825 tons. Based on Pelagic Subcommittee advice, this left 38,834 tons for the roe fishery. HIAB subsequently approved a fishing plan of 27,800 tons for the 2003 roe fishery. Fisheries are planed so that the sum of catches from all herring fisheries in each area does not exceed the total allowable catch for that area. HIAB considered advice received from First Nations and PSARC in developing the fishing plan.

5.0. SUMMARY OF FISHERIES

5.1. Food Social and Ceremonial (FSC) Fishery

5.1.1. Queen Charlotte Islands

Monitoring of the native roe-on-kelp (k'aaw) fishery was to be conducted primarily by the Haida Fisheries Program (HFP). Fishers were requested to register with Haida Fisheries and were monitored by Aboriginal Guardians as to fishing effort and harvest.

Harvesters normally obtain most food product from Selwyn Inlet during the month of April but were also present and active during the early opportunity in March. In addition, the success of the commercial fishery created opportunity for native harvesters to obtain product for personal use, which had not occurred in previous years when most SOK operations were short of their allowed quota. As a result, the total amount of product harvested for food is thought to be approximately 8,000 lbs., which is higher than the 3,000 lbs. harvested during the 2002 season.

5.1.2. Prince Rupert District

Lax Kwalaams, Metlakatla, Kitkatla, Hartley Bay, Kitsumkalum, and Kitselas comprise the Tsimshian Nation which harvests spawn on vegetation in areas 3, 4, and 5. In addition to the local bands, members of other First Nations sometimes harvest in the area. The FSC allocation in the Prince Rupert area remained at 600 tons of herring in 2003. The Bands may issue designations to individuals including non-Tsimshian natives to harvest within their claimed territories. Harvesting takes place in the Big Bay, North Porcher, and Kitkatla areas. Harvest monitoring is usually conducted by technicians employed by the Bands.

The majority of the reported catch this year was harvested from J Licence operations in Areas 5. Few reports were received from Area 4 but it is expected that most of the product was harvested from the SOK ponds. The harvest numbers represent only a portion of product harvested and are incomplete. The total reported harvest for the Tsimshian nation this year was 4,650 lbs of SOK and 1000 lbs of spawn on boughs.

5.1.3. Central Coast

Kitasoo, Oweekno, Nuxalk, Gwa'sala-'Nakwaxda'xw and Heiltsuk harvested herring spawn for FSC purposes in 2003. The harvest of whole herring was not reported from Central Coast First Nations. Herring spawn was harvested as spawn on kelp, spawn on luggi, and spawn on branches.

Kitasoo First Nations obtained FSC product as spawn on branches, spawn on luggi and spawn on kelp using both village vessels and one of the commercial spawn on kelp operations.

Oweekeno members received SOK from J-licence trimmings delivered to members in the Rivers Inlet Village and Port Hardy.

Nuxalk members received SOK J-licence trimmings that were brought back to Bella Coola

Gwa'sala-'Nakwaxda'xw members obtained SOK from J-licence trimmings which were delivered to the village.

In total, 18,830 lbs of spawn on branches, 14,000 lbs of spawn on luggi (sargassum) and 17,200 lbs of spawn on kelp were harvested by the Kitasoo, Naxalk, and Gwa'sala-'Nakwaxda'xw first nations.

Food fish harvest designation cards, Commercial herring roe harvest designation papers along with a SOK fisheries registration card were issued by the Heiltsuk co-management office to individuals participating in commercial communal, or FSC fisheries in 2003. The main areas harvested this year in both the commercial and FSC herring spawn fisheries were Kwakume Inlet, Spiller Channel, Cultus Sound, and Berry Inlet. Individuals were setting out branches and kelp for FSC purposes in various locations throughout the fishery and after commercial product had been validated. A limited phone survey was conducted to estimate FSC harvest by Heiltsuk members in 2003.

5.1.4. Strait of Georgia

A number of pre-season meetings were conducted to establish fishing plans for interested First Nations. South Coast Intertribal Fisheries (SCIF) was the main contact for these meetings. This group is comprised mainly of the Chemainus, Cowichan, Halalt, Lyackson, and the Penelakut First Nations.

In late February, SCIF advised that they hoped to harvest herring in the southern portion of Area 17 (below Dodd's Narrows). As the season progressed, First Nations were updated on fishing opportunities but chose not to fish in either Areas 14 or 17 and as a result South Island First Nations did not conduct any fisheries.

One First Nation, acting independently of SCIF, did harvest some spawn on vegetation off McKay Point on Newcastle Island. Both the effort and harvest was minimal.

5.1.5. West Coast of Vancouver Island

Barkley Sound: Approximately 2,200 lbs of whole herring was provided by the test vessel operating in Barkley Sound. A small amount of spawn on boughs was also reported to have been harvested in the area, but no spawn on kelp harvest was reported.

Clayquot Sound: Approximately 2,000 lbs of SOK, 4,800 lbs of spawn on boughs and 1,200 lbs of whole herring was reported as FSC harvest in Area 24.

Nootka / Esperanza / Kyuquot: SOK was harvested from commercial ponds and open lines in Area 25, totalling approximately 2,750 lbs of product. Whole herring was provided by the test vessel in the area with a total of approximately 800 lbs provided for FSC purposes.

Quatsino: No FSC harvest was reported from Quatsino sound in 2003.

In total, the WCVI food, social and ceremonial harvest is estimated to consist of 4,800 lbs of spawn on boughs, 4,750 lbs of spawn on kelp and 4,200 lbs of whole herring. These estimates are believed to represent the majority of FSC landings in the WCVI area.

5.2. Roe Fishery

The commercial roe herring fisheries traditionally occur in some or all of five geographic areas corresponding to the major stock assessment regions (Figure 1). Within each of these areas, the usual practice has been to schedule different fisheries for gillnets and seines, so the entire quota within any of the five areas is rarely taken from a single site. The location and timing of fisheries is based on operational considerations, including the suitability of the fish (i.e. size and roe maturity), and accessibility to the fleet. Fishing generally takes place in late February to early March in southern BC, and mid-March to mid-April in northern BC. Opening dates and times for the commercial fishery are announced on the fishing grounds as the roe matures to optimum quality. Specific fishing locations are determined by major concentrations of fish and the potential for the highest roe yield.

A limited entry personal herring seine (HS) or a herring gillnet (HG) licence is required to participate in the roe herring fishery. At this time, there are 252 seine licences and 1260 gillnet licences eligible to participate in the roe herring fishery. The actual number of active licences varies from year to year due licence retirement requirements for vessels participating in the test fishing program (see Section 5.7), and retirement requirements of 10 First Nations spawn on kelp licences (see section 5.3).

In the past, roe herring fisheries were characterised by short intense fisheries, in which the fleet fished to the overall area quota, not to individual licence quotas. This type of fishery often exceeded area quotas due to the high capacity of the fleet to catch fish and the limited ability to obtain accurate and timely catch estimates.

To practise more risk averse management techniques, the roe herring fishery is currently managed under a pool fishery system. In 2003, licence holders were required to pool a minimum of eight seine licences or four gillnet licences in order to fish. There was no maximum number of licences in a pool. Each pool fished independently until their quota was caught. If a pool caught more than their quota, the overages were disbursed in the following priority: given to other pools of the same gear type fishing in the same area; used by test boats of the same gear type working in the area (when feasible); or relinquished to the Herring Conservation and Research Society. Overages caught by a pool in one management area could not be transferred to a pool with an underage in another management area. Additionally, overages could not be transferred between gear types. All 2003 catches (seine, gillnet, and test), were validated at the point of landing by industry funded, designated validators hired through J.O. Thomas & Associates Ltd.

The commercial roe herring fishery is traditionally allocated approximately 75-80% of the PSARC recommended allowable catch. The 2003 roe quota of 27,800 tons was 58% of the

PSARC recommended allowable catch and represented 79 % of the total expected catch for all herring fisheries. (The 2003 quota was up from the 2002 quota of 26,500 tons.) The roe quota was split between the seine and gillnet gear sectors, with the seine sector receiving 55% (15,200 tons), and gillnets receiving 45% (12,600 tons). Total roe herring catch for all areas was 29,393 tons (16,619 tons caught by seine and 12,774 tons caught by gillnet). Information on quotas, catch, opening dates, and open areas can be found in the fishery notice in Table 3. Additional information on seine and gillnet quotas, catches, and number of licences by licence area are presented in Table 4.

All known spawnings in 2003 are presented by location, statistical area, date and survey method (i.e. surface or dive) in Table 5. The spawn area index, or S.A.I. provides an index of abundance and is calculated by multiplying the length and width of the spawn by the percent of the area covered with eggs by the average number of egg layers.

5.2.1. Queen Charlotte Islands

Seine fishery
There was no roe herring seine fishery in QCI in 2003

Gillnet fishery
There was no roe herring gillnet fishery in QCI in 2003

5.2.2. Prince Rupert District

Seine fishery
Twenty (20) licences were issued in two pools for the 1,200 ton quota for a per licence share of 60 tons. The target catch area was Kitkatla Inlet. An additional 368 tons was to be taken for charter payment for a total catch target of 1568.

Assessment operations began with the arrival of the *Kitimat II* on March 10. On March 12 the test vessel *Ocean Venture* arrived and commenced sounding and sampling operations in the area.

Fish stocks did not stage in any abundance in the Willis Bay area this year but appeared to move directly into Kitkatla Inlet. The fish in the Inlet began to show well on March 16 and improved daily. First samples were obtained in the Inlet on March 16/17 and indicated roe maturities of 10% in the Robert Island and Snass Pt. areas. At first this was believed to be early fish, as significant spawns have occurred in the past prior to the majority of the stocks moving into the inlet. Over the next few day stocks began to rapidly increase and it became evident that this was the main body of fish.

An advisors meeting was held in Prince Rupert on March 21. The meeting covered stock status, roe quality, weather and general operation of the fishery. It was decided that things were progressing well and that roe samples would be provided to the industry daily to determine a fishing opportunity.

On the morning of March 23, large bodies of fish were located below Gurd Point, along the Gurd Island shore line. A sample was obtained and showed average fish length at 20.3 cm with a roe

yield of 12%. Samples from this set were examined on-grounds by industry representatives. Roe quality was found to be acceptable and the decision was made to open the area.

At 08:10 Sub Area 5-5 opened to roe herring seine fishing (Figure 2). Three sets were made with final hails totalling 1,356 tons. Test fishermen had agreed prior to the opening to use any overage from the pool fishery for test payment. The area closed at 16:40, March 23.

The catch was validated at 1,382 tons and the remaining charter payment was taken on March 24.

Gillnet fishery:
Two hundred and fifteen (215) licences were issued in 8 pools to take the 2,600 ton quota for a per licence share of 12.1 tons.

Stock assessment in the area commenced March 05. Early in the year herring migration appeared to be following a traditional pattern with fish showing well in the northern assessment areas of Steamer Passage, Emma Passage, the north shore of Hogan Island, Haida Bay and Birnie Island. Most of the stocks persisted in the Haida Bay/Birnie Island area and were tested several times. These tests were consistently made up of small herring, with low roe maturity. Continued soundings in the southern areas showed little sign of herring stocks.

Roe percentages in the Kitkatla area continued to increase to the point of giving the 48-hour notice to seines while the Area 3/4 roe percentages stayed at 2%. Then on March 22 a substantial amount of herring was found in the shallows of Duncan Bay. Gillnet tests were completed with roe maturity in excess of 13%. The fleet was advised to proceed to Prince Rupert. On March 24 a small spawn started on Swamp Island. On March 25 an advisory meeting was held in Prince Rupert. At the time of the meeting the spawn area was about 2 cables in length with a good show of fish holding in the shallows.

On March 27 the spawn area had increased to approximately half a mile. Gillnet tests show mixed results for male female ratios. The weather was forecasted to be good during the day with a storm for the next day. Assessment continued until 13:10 when any possible opening for the day was called off. On the morning of March 28, the spawn area had increased to approximately 1.5 miles with the two main areas of spawn being Duncan Bay and Tree Bluff. Test sets were completed and advisors were solicited for their comments about fishing today given the storm warning issued for the morning. The advisors were split on the decision, however the present water conditions were calm and the longer-range forecast was not good. It was decided to open the fishery at 09:30 in Sub Areas 4-5, 4-6, 4-7, 4-8, 4-9, portions of 4-10 and 4-14 (Figure 2).

First hails at 11:00 indicated over 200 tons caught. The storm hit the area at about 19:00. Hails at 20:00 indicated 1,200 to 1,400 tons caught. The next morning winds were still blowing SE 40 but subsided during the day. By 20:00 it was estimated that 2,350 tons had been taken. On the morning of March 30 the estimated catch was 2,490 tons and the fishery was closed at 17:00 with the target catch achieved. The resulting validated catch was 2,706 tons with a fishery duration of 55.5 hours.

The main fishing areas throughout the fishery were the Duncan Bay/Ryan Point area and the Tree Bluff to Reeks Point area. The peak skiff count was about 55, split evenly between the two areas.

5.2.3. Central Coast

Seine Fishery

The central coast seine fishery had a target catch of 2,000 tons. Thirty-three (33) licences organized in three pools chose this area to fish, resulting in a per licence share of 60.61 tons.

On March 10, part of the Central Coast herring management team arrived in Shearwater and was met by a fleet of boats carrying Heiltsuk representatives. The Heiltsuk representatives made it clear that they would not allow a commercial seine or gillnet fishery in the Seaforth/Spiller area and that they did not feel that their commercial communal needs were being met.

On March 20, an advisory meeting with industry, pool captains, charter vessel captains and Heiltsuk representatives was held at Shearwater. Approximately 100 Heiltsuk representatives attended the meeting. Heiltsuk band council members, hereditary chiefs and representatives reaffirmed their opposition to a commercial fishery in the Seaforth/Spiller area, their commercial communal quota and the overall management of herring stocks in British Columbia.

After reviewing stock status and test set information it was decided that the focus for assessment for the upcoming fishery would be on East Higgins Pass and the Seaforth/Spiller Channel areas.

On March 23, the roe herring seine fleet was informed that industry had looked at the quality of the fish from the latest test set from East Higgins Pass and found the roe quality acceptable. A fishery was planned to open at 14:00 hours. The fishery opened in: East Higgins Pass in a portion of 7-3 west of a line from Jorkins Point to Aldrich Point, and a portion of 6-16 east of Higgins Narrows (Figure 3). By 17:00 the hailed catch was approximately 1,565 tons.

On March 24, at 07:00 the fishery re-opened in: East Higgins Pass in a portion of 7-3 west of a line from Jorkins Point to Aldrich Point, and a portion of 6-16 east of Higgins Narrows. A set was made to catch fish for all three pools and by 14:00 the set was completed with fish distributed to each pools. The set was estimated at 110 tons resulting in a total hailed catch of 1,890 tons. Two of the three pools had attained their quotas at this point and had left the grounds.

From March 25-26 no fish were caught due to gear difficulties or waterhauls. At 17:00 on March 27, the fishery in East Higgins Pass closed for the day with a validated weight plus hailed catch of 2,008 tons. The final seine validated catch for the Central Coast Area for the 2003 season was 2,054 tons with a duration of 86 hours.

Gillnet Fishery

Thirty-two (32) gillnet licences formed 5 pools to catch the 300 ton Central Coast gillnet quota. The per licence share was 9.375 tons.

The fishery opened at 11:00 on April 2 in the following areas: a portion of sub area 6-16 south of the line from Wilby Point to Lombard Point, 6-17, and that portion of 7-3 west of the line from Jorkins Point to Aldrich Point (Figure 3). By 15:30 of the same day all five pools were fishing with 16 nets operating. Shakes were reported as moderate to heavy. By the end of the first day one of the pools had taken their quota and left the fishing grounds.

Approximately 272 tons of the 300 ton total quota was taken before 06:00 on April 3 with three of the five pools having taken their quota and left the grounds. Spawn activity along the beach south of Wilby Point expanded to south of Abrams Island. By 14:00 the fishery closed in Higgins Passage area with all pools attaining their quotas.

The Central Coast roe herring gillnet fishery was open for a total of 27.0 hours with a total validated weight of 318.71 tons.

5.2.4. Strait of Georgia

Poor weather hampered both the seine and gillnet fisheries. In-season assessments indicated stock abundance in St. of Georgia continued to be very strong, and another year of good recruitment was expected. Peak soundings in Area 14 were 138,100 to 166,800 tons on March 6. Spawn in the Strait of Georgia was near record levels, with approximately 96 miles of spawn recorded including 17 miles of spawn below Dodd's Narrows. However, dive teams were severely hampered by poor weather, and by what appeared to be a quicker hatch out rate this year. As a result, not all known spawn deposited in the St. of Georgia was surveyed in 2003.

Seine Fishery

One hundred and fifty-two (152) seine licences in eight (8) pools participated in the Strait of Georgia seine fishery. The seine quota was 9,800 tons for a per licence share of 64.47 tons

On March 14, there was a weather window forecast that allowed fishing to take place. The fishery opened at 07:01 March 14 which is the earliest opening time ever. A total of 68 sets were made, (15 of which were waterhauls) and 53 sets caught 10,897 tons. Open areas were Ship Pt. to Comox Harbour (Sub Areas 14-8, 14-11, 14-14 and 14-15 (Figure 4)). The fleet was distributed from below the Denman Ferry up to Whitespit. Fishing was heaviest at the ferry crossing area, and there were a number of extra large sets made there. The quality of the fish was better in the Henry Bay / Sandy Island area. No sets took place after 11:30. Several extremely large sets (e.g. 769 tons, 692 tons) as well as a number of 350 – 500 ton sets were made with poor initial hails. The area officially closed at 16:45. When the fishery was closed, the projected catch was still 2,400 tons under quota based on hails. The large sets were responsible for the overage and inability to close on time.

March 14 was the latest date for a seine fishery in Baynes Sound. Historically, March 15 was the latest seine fishery ever in the St. of Georgia, and it took place in Powell River.

The Strait of Georgia seine fishery was open for 9 hours, 44 minutes for a total validated catch of 10,897 tons, although actual fishing time was 4.5 hours.

Gillnet Fishery

Nine hundred and thirteen (913) gillnet licences in fifteen (15) pools participated in the Strait of Georgia gillnet fishery. The gillnet quota was 8,700 tons for a per licence share of 9.53 tons.

There was a problem getting the gillnet fishery started. The decision rules for opening had been established prior to the season, were discussed at HIAB and at the St. of Georgia gillnet pool captains meeting, and were not new in 2003. The agreed upon rule for opening is that if there is approximately 1.5 miles of spawn, with some fish backing it up, and if one pool wants to go

fishing, the manager will open the area. Pools that do not wish to start fishing are not obligated to do so. After several radio conferences with pool captains, the area was opened for gillnet fishing on March 16 at 15:00. There was 15 miles of active spawn at time of opening, which increased to 32 miles on March 17. Twelve of the fifteen pools were fishing by the end of the first day. All 15 pools were actively fishing by March 17.

Approximately 1,500 to 2,000 tons were caught by the morning of March 17. It is doubtful the gillnet quota for the area would have been achieved if the fishery had not started on March 16. By March 19, three of the pools had caught their quota. Fishing was slow throughout the fishery. The fleet moved from East Coast of Denman Island down to French Creek, Parksville Bay, Northwest Bay, Schooner Cove, Dorcas Point, and Lantzville to take advantage of the better active spawns. By March 22, 11 pools were finished while the remaining 4 pools continued to fish until March 23, when the area closed at 12:00. All pools obtained their quota. Overall, gillnet tests averaged 16.5%

The gillnet fishery was open for 6 days, 21 hours with a total validated catch of 8,707 tons. Reasons for the extended fishery include poor weather, not enough gear on the grounds, and small fish.

5.2.5. West Coast of Vancouver Island

Seine Fishery

Thirty-five (35) licences in three pools participated in the seine fishery in 2003 with a target quota of 2,200 tons. The per licence share was 62.86 tons.

The Barkley Sound stock assessment program started on February 21. The first test set showed roe maturity at 8.2%. While it appeared the roe maturity was high for February 21 what was more interesting was the number of spawned out fish in this test. Based on the number of spawned out fish found in test sets, bird activity, and past occurrences of early spawns, the area between Forbes and David Islands was raked for signs of spawn. One layer of spawn was found and a preliminary dive assessment was conducted February 28 and found two separate spawns in the area, with the second occurring within the last two days. A dive survey was conducted on March 4 and 5. The area of spawn was fairly large and averaged 4-5 layers.

Soundings peaked on March 3 at 19,600 tons, with the majority of the fish located from St. Ines Island to the area south of Forbes Island. Fish were also found in customary areas such as Macoah Pass, Toquart Bay, Pipestem Inlet, David Channel and Sechart Channel. Fish were also observed in Imperial Eagle Channel from Swale Rock to Gibraltar Island.

The seine fishery opened at 13:00, March 10 in portions of subareas 23-9, 23-10 and 23-11 (Figure 5). Fishery officers provided all licensed vessels with maps of the open area with corresponding latitude and longitude co-ordinates. At the time of opening, pools were given permission to set a total of eight vessels.

The best fishing occurred in the first four hours of the fishery with approximately 1,100 tons caught. From the opening of the fishery until 19:00 approximately 18 sets were made with 10 sets retaining fish, 7 water hauls, and 1 set released because of small fish. After consultation with the fleet the fishery voluntarily closed for the evening at 19:00.

The fishery recommenced at 06:30 March 11. Based on the previous day's catch rate a conservative approach was taken when allowing boats to set. Second sets were not allowed until confirmed hails were received. As the day progressed fishing was generally slow and pools were given permission to set two vessels at once. Twenty-two sets were made with 7 sets retaining fish, 12 water hauls and 3 sets released. Approximately 500 tons of fish were caught on March 11.

A spawn started along the Vancouver Island shoreline of Macoah Pass from the Toquaht First Nation village to Cabbage Rocks. Spawn was reported on the morning of March 12 off of the shack between Cabbage Rocks and Food Islets and on the west side of David, Ottaway and St. Ines Islands. There was no new spawn observed on March 13 but spawn assessment was limited by weather conditions.

On March 12, 13 and 14 a storm with winds gusting to 50 knots hampered fishing. Fishing was restricted to the most northerly portions of the open area: Mayne Bay, Toquart Bay and Pipestem Inlet. Twelve sets were made over the last three days of the fishery with nine sets retaining fish. The majority of those sets (9) were made on March 12 prior to the full impact of the storm. The remainder of the quota was achieved by 11:00 March 14.

The fishery closed at 11:00 March 14 with a validated catch of 2,284.69 tons and a duration of 70 hours.

Gillnet Fishery

Eighty-seven (87) gillnet licences in 7 pools participated in the WCVI gillnet roe herring fishery with a target quota of 1,000 tons and a per licence share of 11.49 tons.

Stock assessment began in Area 25 on February 26. Preliminary estimates indicated 5,000 tons in the area. There were two roe tests made on this day; one inside Center Island which averaged 3.25% roe yield and the other between Rosa Harbour and Center Island that averaged 3.0%.

An advisors meeting was held in Zeballos on March 8 with representatives from 2 of the 7 pools attending. The potential boundaries to protect FSC harvest and the open SOK lines were discussed. All pool captains from the area agreed that the opening would occur whenever a pool requested to go fishing.

On March 16 the fish held in the SOK ponds were released from Rosa Harbour. It is interesting to note this was the last time any fish were observed in Rosa Harbour until spawning began on March 24.

During the morning of March 24 small spawns were reported in Outer Nuchatlitz and at the western approach to Inner Nuchatlitz. Area 25-13 (Figure 6) opened at 12:15. The fishing was spotty with initial shakes reported to be anywhere from 500 lbs. to 2 tons. By 07:00 March 25 the hailed catch was 593 tons. Initially all of the punts were fishing in Outer Nuchatlitz near Ensanada Island but as the spawn gradually spread into Inner Nuchatlitz some of the fleet moved inside. During the evening of March 25 the wind picked up and conditions on the outside deteriorated such that all of the fleet moved to the inside. The first pool reached their quota at 16:30 March 26 and by March 27 all pools except one had reached their quota. On the morning of March 28 a survey of the one remaining packer and the punts fishing indicated that the quota was

close to being caught and at 10:35 all skiffs were notified to pull any nets left in the water. The fishery closed at 12:15 on March 28 with a validated catch of 1,042 tons and a duration of 118 hours.

5.3. Spawn on Kelp Fishery

Spawn on kelp (SOK) fisheries generally take place in March and April, with fisheries progressing in-season from south to north. In some years, fishing will persist into May and June in more northerly locations. The fishery generally is carried out at specific locations where there are adequate herring spawns, and the herring are accessible to ponding operations.

The 2003 commercial SOK fishery occurred in 4 of 5 geographic areas corresponding to the major stock assessment regions (Figure 1): Queen Charlotte Islands (Area 2E); Prince Rupert (Areas 3,4,5); Central Coast (Areas 6,7,8); and West Coast of Vancouver Island (Areas 23, 24, 25). In addition, some licences operated in locations supporting minor herring stocks, including Quatsino Sound (Area 27), Johnstone St. (Area 12), and Smith Inlet (Area 10).

During the annual herring planning process, herring was allocated from the TAC for the spawn on kelp fisheries. This allotment is to allow for the average per-licence production of 8 tons of spawn on kelp product. Mortality and egg loss is considered in the formula used to calculate the requirement of 100 tons of herring per closed pond operation and 35 tons per open pond. In 2003 1,000 tons of herring were allocated in both the Prince Rupert and QCI areas, 600 tons in the Central Coast, and 400 tons in the WCVI area. An additional 375 tons was allocated from the minor stock assessment areas and 525 tons in the Central Coast for Heiltsuk commercial communal spawn on kelp fisheries. This allocation allowed for 2003 a commercial spawn on kelp coastwide quota of 411.571 tons of product.

Forty-six (46) category "J" and "FJ" licences were issued to harvest herring spawn on kelp in 2003. The majority of licence holders in this fishery are First Nation individuals or tribal groups (37 of 46 licences). Individual quotas (IQ) are specified on each licence. In 2003, individual quotas were based on 8 tons of drained product and subject to the quota carry over provisions. Exceptions to the 8 ton catch allocation exist for Native band licences which have not met roe herring licence retirement provisions[2], and for three Heltsiuk licences (FJ-1, FJ-39, and FJ-41) which each have a quota of 24 tons (48,000 lbs.).

A quota carry-over program introduced in 1996 was continued in 2003. This program allows spawn on kelp licence holders to carry over reasonable IQ overages or underages, from one year to the next. The rules for carry over are as follows:

- Licence holders whose product weight at the end of the season is under the IQ by 2000 lbs. or less will have the equivalent weight of the underage added to their IQ in the following year.
- Licence holders whose product weight at the end of the season is under the IQ by more than 2000 lbs. will have 2000 lbs. added to their IQ in the following year and will forego the remainder.

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[2] The 10 FN band licenses introduced in 1991 and 1992 are each required to designate 4 gillnet licenses as inactive in a given year, unless they have permanently retired the licenses. If a license does not retire all 4 licenses, their SOK quota is prorated.

- Licence holders whose product weight at the end of the season is over the IQ by as much as 1000 lbs. may retain the overage, and the equivalent weight of the overage will be subtracted from the licence holder's IQ in the following year.
- Licence holders whose product weight at the end of the season is over the IQ by more than 1000 lbs. may retain 1000 lbs. of the overage, and must relinquish the remainder to the SOKOA. Further, the weight of the total overage will be subtracted from the licence holder's IQ in the following year.

The weight of the spawn on kelp product to be applied against an IQ is the total drained weight of spawn on kelp product validated at the landing port. A salt allowance, equal to 5% of the total drained weight, is applied to compensate for salt and entrained water (i.e., the total validated weight will equal the drained weight minus 5% of the drained weight).

The transfer of SOK product between licence holders operating in different stock assessment regions is not allowed. Spawn on kelp product can be transferred on-grounds between licence holders in the same stock assessment region. In-plant transfers of product between licence holders from the same stock assessment area can be carried out subject to the prior approval of a Fisheries and Oceans representative.

The Spawn on Kelp Monitoring Program (SOKMP) funded by the Spawn on Kelp licence holders Association (SOKOA) was introduced in 1996 and continued for the eighth consecutive year in 2003. The objectives of this program are to monitor aspects of the fishery using on-ground monitors and port validators. On-ground monitors document fishing and harvest activities of each SOK operation. Port validators validate the landed harvest with records from the on-ground monitor and record final landed weights. Port validators also monitor in-plant transfers of both processed and unprocessed product between licences and audit the utilisation of J-licence export buckets and bucket decals during processing.

On-grounds monitoring was provided through the assignment of nine monitors coastwide. A total of 181 monitoring days were expended during the 2003 fishery. In QCI, one monitor provided coverage for the 10 J licences operating in area 2E. Two monitors worked in the North coast to provide coverage in Area 3 / 4 and Area 5. Three monitors provided on-grounds monitoring in the Central coast for 10 J licences operating within Areas 7 to 12. Three monitors worked in the WCVI to provide coverage for operations in Areas 23, 24, 25 and 27. Areas 5, 12, 23_ 24, and 27 assignments were conducted from Kitkatla, Port Hardy, Ucluelet, Tofino, and Winter Harbour respectively. All other monitoring assignments were conducted from chartered vessels on the grounds.

The SOKMP provided coverage by six port monitors, who were assigned to one of eight designated landing locations on the coast, and observed landings to 10 different processors. Some port monitoring requirements were completed by on-grounds monitors opportunistically. Monitors validated landed harvest documented by on-grounds records, validated drained weight measurements and in-plant transfers of both processed and unprocessed product between licence holders, and audited the utilisation of J-licence decals and pails during processing.

The SOK coastwide landings for 2003 were 402.438 tons based on 8 ton individual licence quotas adjusted according to carryovers from 2002. These landings include the 48 ton enhanced production from three Heiltsuk communal licences. SOK landings by area can be found in Table

6. Overall, 48% of total production came from open line operations and 52% from closed ponds. Open line production was utilized to some extent in all management areas in 2003, but the majority of open line product came from the Heiltsuk licences in the Central Coast and in Areas 25 and 27 on the WCVI.

5.3.1 Queen Charlotte Islands

Due to conservation concerns a precautionary SOK management plan was developed and approved as an appendix to the SOK IFMP for QCI in 2003.

In December 2002, a series of conference calls with QCI SOK licence holders were held. The objective was to establish an early co-operative working relationship amongst the licence holders and to define two groups of 5 operators. In the end there were three groups (5 licences, 3 licences and 2 licences) agreeing to work together.

The season began late in February in Selwyn Inlet. Some efforts were also dedicated to set up ponds in Louscoone Inlet and Skincuttle Inlet. Most QCI SOK operators also had roe herring interests in other areas, particularly in the Gulf. This situation caused some concern over lost early opportunities.

The majority of operators did not show up on QCI until after March 20. By this late date all efforts went into the only two viable opportunities, which were in the Jedway Bay area of Skincuttle Inlet and Nomad Island in upper Burnaby. Locations where herring were located and the severe shortage of kelp caused much concern over the practical expectations of open ponding. All operators did adhere to the requirement regarding approval of attractor (closed) ponds prior to setting up. Although some compromises had to be made to the precautionary management plan, the impact of the fishery on stocks was reduced from what it would have been in an open competitive fishery.

In total, over the course of the season 25 ponds were established between February 28 and April 18. Open ponds were set up in all locations, to varying amounts, but were only marginally successful in Selwyn Inlet and Jedway Bay.

During the 2003 roe-on-kelp season monitoring and recording of all ponding and harvesting activities were the responsibility of the validator, set up as a subcontract to the Haida Fisheries Program through J.O.Thomas & Associates. One monitoring assignment on the Queen Charlotte Islands covered 10 J licence operations in PFMA 2E from Huston to Selwyn Inlets over a single deployment from March 11 to April 15. Early season operations in late February and early March at Selwyn Inlet and Swan Bay were not covered ongrounds by the SOKMP rather these were covered by FOC patrols until March 11

Of the overall QCI harvest, 16% was taken early at Selwyn Inlet, 6% from Skaat Harbour, 30% from Nomad Island, 36% from Jedway Bay and 12% from Huston Inlet. 17% of production came from open line and 83% from closed pond operations. All licences harvested to within carryover limits.

5.3.2 Prince Rupert

Ten licences operated in the north coast, with three located in Kitkatla Inlet and seven located in Area 4 in the Pearl Harbour, Big Bay, Venn Pass and Island Point areas. All licences harvested to

within carryover limits, with final harvesting completed in early June. In Area 4, 33% of production came from Island Point, 28% from Venn Pass, 28% from Big Bay, 9% from Tugwell Island and less than 1% from Pearl Harbour. Approximately 10% of total north coast production was taken using open ponds, all of which came from Kitkatla.

5.3.3 Central Coast

Nineteen licences, including 9 Heiltsuk licences, operated on the Central Coast between Beaver Harbour in Area 12 and Kitasu Bay in Area 6 including Takush Harbour, Illahie Inlet, Kwakume Inlet, Cultus Sound, Berry Inlet, Lower Spiller Channel, Powell Anchorage, and Higgins Pass. The total production quota for these licences was set at 198 tons with an actual harvest of 200 tons taken between March 25 and April 26: of this, 120 tons was taken by Heiltsuk licences. Overall, 72% of the Central Coast production came from open lines.

Of note, good production came out of Beaver Harbour and Illahie over a very short production period of only 8 days each. Substantial commercial open line production came out of lower Spiller Channel and Berry Inlet for the first time. As well, the four-licence pool operating in Powell Anchorage produced 44,000 lbs from just three ponds. In contrast, notably poor production came from this pool's eight ponds at Higgins Pass out of which less than 7000 lbs of commercial product was harvested. As a result, this pool moved into Kitasu Bay / Marvin Islands, where SOK operations have not occurred for some time, to complete their quota with good production. In general, Central Coast operations, at least in Areas 6 and 7 appeared to have had access to more and better kelp than most of the rest of coast

On-ground monitor coverage and in plant validation was provided by the SOKMP for all operations except the Heiltsuk communal commercial licences. In 2001, the Heiltsuk withdrew from the SOKOA monitoring program. Therefore, as in 2002, the Heiltsuk Fisheries Program, DFO Resource Management and C&P Staff provided a separate monitoring program for these licences. Heiltsuk guardians and DFO fish management staff worked to monitor on grounds operations of the communal SOK fishery, while DFO C&P staff was present for all validations at the plant. The fishery operated using an individual quota system with each applicant issued a personal quota. Personal quotas were then combined into a harvesting crew quota. In total 84 crews, ranging in size from 1 to 9 people, were registered for the Heiltsuk SOK fishery. SOK product harvested under the FJ licences but not delivered to the Bella Bella plant due to achieving the quota was used as FSC SOK.

5.3.4 West Coast Vancouver Island

The 2003 forecast abundance of herring for WCVI (Areas 23-25) was for an increase over 2002. While Area 27 saw an improvement in spawning biomass in 2002, there were concerns regarding abundance in 2003. Finding enough good quality kelp was a real problem this year throughout the WCVI. Considerable time, energy and funds were expended in harvesting and transporting kelp. This problem was exacerbated by stormy weather.

A monitoring plan was eventually negotiated with SOKOA. One monitor would cover Area 23 and 24 and a vessel based contract was again in place for Area 25. The monitor onboard the test vessel operating in Area 27 would monitor operations in Winter Harbour until the vessel's contract was complete. Following that, J. O. Thomas would dispatch a monitor as required.

One licence originally set up in Area 23 with the first fish impounded on March 2. Immediately there were problems with sea lions with up to 50 animals in the immediate vicinity of the pond. The sea lions could easily enter the pond but had more difficulty with getting out. Eventually the net was ripped allowing the remaining herring to escape. This operation was subsequently moved to Sydney Inlet in Area 24.

As a result of the operator moving from Area 23, two licences worked in area 24 in the Young Bay, Sydney Inlet area with the second operator arriving March 20. Both operations experienced problems, particularly with finding quality kelp, and as a result, both licences had significant harvest deficits for the year.

In Area 25 and 27 the remaining five licences harvested to within carryover limits with good production reported from open line operations both in Winter Harbour and Port Langford. Area 27 had two open pond licences operating in the area, while one licence remained temporarily relocated to Area 25. FSC product was harvested from a communal pond in Area 25, along with open line product remaining once quota was achieved. In Area 27, approximately 26,000 lbs of product was left to hatch after both operations in the area had reached quota.

5.4. Winter Food and Bait Fishery

The winter food and bait fishery normally takes place in the Strait of Georgia between November and early January when the fat content of the fish is the highest. This fishery is intended to supply a small amount of fish for secondary processing for food as well as meet some of the frozen sports bait and commercial bait requirements. The demand for this type of product has been relatively small for the past several years and the allocation has been limited to 900 tons.

This fishery is licenced under the "ZM" category and vessels are selected on an annual basis through a lottery draw. In order to qualify for the lottery a vessel must have a history of either fishing roe herring under a "HS" category licence, or a spawn on kelp "J" licence designation sometime within the past five years. Successful vessels are also required to meet stability requirements under the Canada Shipping Act. Observers are required to be on board the fishing vessel at all times when the vessel is catching or transporting herring. In addition a dockside validator is required to monitor offloading of the catch.

Prior to 2001, the allocation was split between lower Johnstone Straits (Area 13) and Georgia Strait (Areas 14-18) with 200 tons allocated to the Area 13 and the remainder allocated to the Georgia Strait area. Due to changing migration patterns of incoming fish, the two areas were combined into one large area in 2001. This provided more flexibility for fishermen to obtain their quota.

In 2002 the total quota was 900 tons and was broken down into 18 individual 50 tons non-transferable licences.

The fishery opened on November 03 but there was no fishing activity until November 15. A total of 558.6 tons was landed between November 15 and January 30 (Table 7). Of this total, 428.6 tons was caught in Area 17 between Northumberland Channel and Nanoose Bay with the remaining 130 tons was caught in Area 14, off Norris Rocks. Only 12 of the 18 licensed vessels fished. The reason for the quota shortfall was a lack of market demand, particularly for commercial bait.

5.5. Special Use Fishery

The special use herring fishery provides opportunities to utilise herring in alternative ways to the mainstream herring fisheries. Herring are caught for use as commercial sport bait; personal-use commercial bait; food, charity sales, zoo and aquarium food, and commercial bait sales.

A ZX or ZY licence is required to participate in the fishery, and a commercially licensed vessel is required for harvesting catch. Herring caught for personal-use commercial bait require a one ton ZX licence. A 3-ton ZY licence is required if the herring are caught for sale. A limit of five active 3-ton ZY licences can be designated to a catcher vessel at any given time. Licence holders can be re-issued another licence in the same licence year provided they can demonstrate the current licence allocation of herring has been utilised (i.e. by submitting a completed landing report).

The allocations for the special use fishery are in addition to the fall food and bait lottery fishery. In 2002, the coastwide allocation for special use fisheries was 1160 tons. The breakdown was as follows: 20 tons commercial bait sales; 500 tons sports bait sales (which includes Walcan's 300 ton licence); 55 tons for personal use bait; 200 tons for food (i.e. Fjord licence); 275 tons for charity sales; and 110 tons for zoos and aquariums (Table 2). There were 5 ZX and 69 ZY licences granted in 2002. Total 2002 coastwide catch in the Special Use fishery was 774.0 tons (Table 7), including landings from Fjord and Walcan licences. Landings tallied from landing reports by licence type and area are summarised in the attached table.

5.6. Herring Conservation and Research Society

At the 1995 fall HIAB meeting, Department of Fisheries and Oceans (DFO) and industry representatives discussed and agreed to the formation of a non-profit organisation, the Herring Conservation & Research Society of BC (HCRS). The role of the Society is to support research that addresses the need for knowledge and understanding of herring biology and the factors that affect fluctuations in abundance. The goal of the HCRS is to assist DFO in developing the tools necessary for ensuring precautionary and risk averse management of the herring resource.

In the fall of 1996, the HCRS entered partnering arrangements with DFO related to fisheries management. A joint project agreement was signed, wherein the HCRS assumed responsibility for the test fishing program. The Society was given an allocation of fish to use to conduct the test fishing program. This allocation was determined by HIAB, in conjunction with DFO, and was included in the 1996/97 TAC. A portion of the roe herring TAC has been allocated to the HCRS to carry out test fishing activities in each subsequent year. The HCRS conducted test fishing activities for the seventh year in 2003[3].

A significant development in 2002 was the formation and implementation of an HCRS Science Review Panel. The purpose of the Panel is to conduct an annual independent review and evaluation of all research proposals submitted to the HCRS, and subsequently make recommendations to the HCRS Board of Directors. The Panel also advises the Board on aspects of herring biology, and conservation as required.

Eleven science proposals were submitted to the HCRS for funding in 2002. In general, the Panel found the projects addressed important stock assessment issues. All research proposals submitted were ultimately approved, although some of the projects were required to complete further

[3] See Section 5.7 Test Fishing Program

analyses and provide additional justification prior to funding. The projects were broken down into four focus areas:

1. stock identification
2. juvenile recruitment
3. stock assessment
4. biology and ecosystem concerns

5.6.1. Research Projects:

Coded Wire tagging program

This program was designed to investigate herring stock structure and straying rates among assessment regions. Herring are tagged on the spawning grounds, herring catches are scanned as they go through detectors in the plants, and tags recovered in the plants. In 2003 (as in 2002), a vessel was hired through the test fishing program, and 326,639 herring were tagged in St. of Georgia, Central Coast, and Prince Rupert. A total of 2,581 tags were recovered.

Spawn Disappearance and Recolonization Events

This project analysed herring spawn data, and found that the disappearance of herring spawn, and subsequent reappearance, some time later, is a recurring phenomenon is the spawn records. This project found that 63% of herring sections in B.C. displayed one or more disappearance events over the last 61 years. Half of these disappearances lasted about 8 years before the section was recolonized. About 10% of the sections were not recolonized after 20 years.

Herring molecular genetics survey

The DNA study surveys variation in genetic markers in herring samples and evaluating the results to determine whether the samples have been derived from a single breeding population.

Herring have been collected from the start of the program in 1998. While the general results from the survey are of limited genetic differences among herring in BC, there are some differences. On the east coast of QCI, herring spawning in Skidegate Inlet are distinct from those spawning further south in Selwyn Inlet, Section Cove, and Skincuttle Inlet. In the St. of Georgia, herring spawning in Portage Inlet / Esquimalt Harbour near Victoria are very distinctive genetically.

Laser Ablation of Herring Otoliths

This was the subject of a thesis for a University of Victoria student. This project determined the utility of otoliths sampled by laser ablation to detect differences in stock origin and biology.

The data has not been fully analysed, but preliminary indications are that otolith microchemistry can provide information on the origin of herring individuals. If this method is extended, it could provide additional information on movements between stock assessment regions, which would be relevant to the stock concept and meta-population analysis.

WCVI recruitment and euphausiid productivity

A recruitment forecasting survey has been conducted annually on the WCVI since 1986. The forecasting methodology has been accepted by PSARC and is incorporated into annual WCVI forecasts. The methodology and survey information used to estimate WCVI recruitment may also be able to be used to estimate St. of Georgia recruitment.

This project also monitors euphausiid productivity and relates that information to size at age trends.

Juvenile Recruitment Survey in the St. of Georgia

Juvenile surveys continued in 2002, following protocols used for the last 10 years. The survey methodology was reviewed by PSARC. PSARC concluded that surveys of age 0+ herring made in the fall may provide a useful but approximate estimate of future recruitment. These surveys also contribute to increased understanding of factors affecting the strength and timing of year class strengths in herring.

Juvenile Recruitment Survey in the Central Coast

Feasibility study done in 2002.

Database improvement

Funds provided for Stock Assessment database improvements. These ongoing upgrades allow for improved access to existing information.

Area based analysis.

This project was designed to integrate a range of available data at small geographical levels. Much of the information presented on the DFO science website is available as a result of funding for this project.

Bait Fish Survey

A bait fish survey in the St. of Georgia attempted to quantify the distribution and abundance of bait fish stocks in east side of St. of Georgia, and in southern Johnstone St. Biological information as well as DNA samples were collected.

5.7. Test Fishery

A regional herring test-fishing plan is developed for each season. The plan takes into consideration stock assessment requirements (i.e. are there enough vessels to conduct spawn surveys and to adequately sample fish stocks) and management needs. In most cases, a test fishing vessel is required to retire a licence for the season (either seine or gillnet, depending on the charter) in order to participate in the test fishing program.

5.7.1. 2003 Test Fishing Program

The 2003 test fishing plan was approved by HIAB at the October 2002 meeting. The HCRS received an allocation of 2,825 tons (which included 200 tons to fund research projects) to administer the test fishing program. This allocation was part of the commercial roe herring TAC.

In total, 25 vessels participated in the 2003 test fishing program. A summary of vessels by categories, area worked and licence retirement requirements are found in Table 8.

In the Queen Charlotte Islands, 3 test vessels operated. The *Viking Pride* worked primarily in area 2W, but also provided some seine test coverage in 2E. The *Viking Pride* also conducted some surface spawn surveys in Area 2W. The *Queens Reach* worked in 2E to provide seine test information and the *Haida Provider* conducted all dive surveys in the QCI area. A total of 338.21 tons of payment fish was required for test vessels operating in the QCI area. Due to predicted low stock abundance in the area, payment fish was taken from Prince Rupert, Strait of Georgia and WCVI by test vessels working in the areas.

Three vessels conducted test fishing operations in the Prince Rupert area. The *Karenora* provided seine test operations in Areas 3 and 4, and the *Ocean Venture* conducted seine test duties in the Kitkatla Inlet area. Gillnet test and spawn surveys for the Prince Rupert area were conducted by the *Royal Pride*. The *Royal Pride* was also used briefly as an assessment vessel for the Area 3/4 gillnet fishery. The total requirement for the Prince Rupert test vessels, including the QCI and Area 27 vessels was 500.22 tons.

In the Central Coast region, 5 vessels preformed test fishing operations in 2003. Gillnet test and dive surveys were conducted by the *Ocean Explorer*, while seine test and dive surveys were provided by the *Christav*. Seine tests were conducted by the *Kynoc* as a full charter, and the *Pachena No.1* as a split charter with the Strait of Georgia. The *Lasqueti Star* operated as the assessment vessel. A total of 528.06 tons of payment fish was required from the Central Coast.

In the Strait of Georgia and Johnstone Strait, a total of 11 vessels participated in the test fishing program. Gillnet test and dive surveys in the Strait of Georgia were conducted by the *Thunder 1* and *Silver Viking*. Surface surveys in areas 12 and 13 were provided by the *Port Lincoln* and *Discovery Huntress*, which were both paid in dollars per day for their services. Full seine charters were conducted by the *Bernice C* and *Royal Mariner 1*, while the *Savage Fisher* and *Pacific Skye* conducted short, no licence charters. The *Pachena No.1* worked a split charter between the Strait of Georgia and the Central Coast, although the majority of the charter was spent in the Strait of Georgia due to the late fishery timing. The seine assessment vessel was the *Styrian Knight*, and the gillnet assessment vessel was the *Free to Wander*. The *Ocean Marauder* conducted coded wire tagging operations in the Strait of Georgia, Central Coast and Price Rupert areas. Total test payment requirement for vessels operating in or receiving payment from the Strait of Georgia 1,012.712 tons.

On the WCVI, four vessels provided test fishing information. Dive surveys and seine test were conducted by the *Viking Joy* in Area 25 and 26 and the *Royal Viking* in Areas 24 and 23 while the *Ocean Horizon* conducted seine testing work in Area 23. A short no licence charter was done by the *Nita Maria* to provide seine test information from Area 27. Payment fish for the *Nita Maria* was taken in the Prince Rupert area. The total test payment fish required from the WCVI was 538.53 tons.

The total test fish requirement for all areas in 2003 was 2,579.52 tons and 2,344.77 tons were caught. The shortage was made up from pool fishery overages. Test fishing vessels are listed in Table 9 by area and dates of operation, bid rates, duration and final payment requirements are listed by vessel in Table 9. Test fishing requirements and catch by region, location and date are found in Table 10.

Acknowledgements

The information contained in the "Summary of Fisheries" section was provided by area managers from reports presented at the April 2003 HIAB meeting. Charles Fort of DFO Stock Assessment provided spawn summary data presented in Table 5. Some of the information in the Spawn on Kelp section was provided by SOKOA, and Table 6 was adapted from final SOK landings provided by J.O. Thomas and Associates on behalf of SOKOA.

References

Schweigert, J. 2002. Stock assessment for British Columbia herring in 2002 and forecasts of the potential catch in 2003. Canadian Science Advisory Secretariat Research Document 2002/110:91p.

Schweigert, J.F. and D. Ware. 1995. Review of the biological basis for BC herring stock harvest rates and conservation levels. PSARC Working Paper H95: 2.

PSARC. 2002. Proceedings of the PSARC Pelagic Subcommittee Meeting, September 4-6, 2002. Canadian Science Advisory Secretariat Proceedings Series 2002/010. http://www.dfo-mpo.gc.ca/csas/Csas/English/Proceedings%20_Years/2002e.htm

Table 1. 2003 Forecast biomass (tons), recruitment assumption, and recommended yield by region.

Region	Cut-off Biomass (tons)	Model Used	Recruitment Assumption	Observed Recruitment	Forecast Biomass (tons)	Recommended Yield (tons)
Queen Charlotte Islands	11,795	RASM-2q	Average	Good	7,937	0
Prince Rupert District	13,338	RASM-2q	Average	Good	34,900	6,977
Central Coast	19,401	RASM-2q	Average	Good	27,844	5,567
Strait Of Georgia	23,369	RASM-2q	Good	Good	143,311	28,660
West Coast Vancouver Island	20,723	RASM-2q	Poor	Good	33,102	6,625
Total					**247,094**	**47,829**

Table 2. Herring working group - 2002 / 2003 expected herring use (tons) by fishery and area

Region	STOCK ASSESSMENT COMMITTEE RECOMMENDED CATCH	MANAGEMENT WORKING GROUP CATCH QUOTA	HERRING MANAGEMENT WORKING GROUP ALLOCATIONS												
				ROE HERRING			SOK		WINTER	BAIT IMPNDMNT		PERS'L USE BAIT	CHAR -ITY	ZOO & AQUAR	TOTAL
	CATCH (a)	CATCH	FSC (b)	COM (d)	ACTUAL	HCRS (e)	J-LICENCE	COMM COM	FOOD & BAIT	COMM.	SPORT				NON-ROE
QCI	0	0	150	0	0	0	1,000	0	0	0	0	0	0	0	1,150
PR	6,977	3,800	600	4,487	3,800	610	1,000	0	200	20	50	10	0	0	1,880
CC	5,567	2,300	600	3,192	2,300	530	(170) 600	525	0	0	100	20	0	0	1,845
GULF	28,660	18,500	35	25,655	18,500	1,110	(100)	0	(c) 1,400	0	50	25	275	110	1,895
WCVI	6,625	3,200	150	5,500	3,200	575	(105) 400	0	0	0	0	0	0	0	550
TOTAL	47,829	27,800	1,535	38,834	27,800	2,825	(375) 3,000	525	1,600	20	200	55	275	110	7,320

a) Based on forecast abundance of major migratory stocks (Minor stocks are shown in brackets).
b) Communal licences for food social ceremonial purposes will not limit access. DFO will work with the First Nations on a co-operative catch monitoring program.
c) Includes 300 ton allocation to Walcan and 200 ton to Fjord
d) Commercial roe allocation does not necessarily reflect the actual quota utilised
e) HCRS is part of the roe quota and not included in the total non-roe amount

Table 3. Final fishery notice of the 2003 roe herring fishing season.

AREA	NO. OF LICENCES	TARGET CATCH	CATCH*	% TOTAL CATCH	FISHERY DATES AND LOCATIONS
Strait of Georgia:					
Seine	152	9,800	10,897	37.1	Open 07:01 to 16:45 Mar 14 in Subareas 14-8, 14-11, 14-14 & 14-15.
Gill Net	913	8,700	8,707	29.6	Open 15:00 Mar 16 to Mar 20. Open areas extended to include Subareas 17-18 & 17-19. Open 09:00 Mar 21 to 12:00 Mar 23 in Area 14 and all of Area 17 except Subarea 17-20.
Central Coast:					
Seine	33	2,000	2,054	7.0	Open 14:00 to 21:00 Mar 23 in portions of Subareas 7-3 & 6-16. Reopened 07:00 Mar 24 to 17:00 Mar 27.
Gill Net	32	300	319	1.1	Open 11:00 Apr 2 to 14:00 Apr 3 in portion of Subarea 6-16, 6-17 & portion of 7-3.
WCVI:					
Seine	35	2,200	2,285	7.8	Open 13:00 to 19:00 Mar 10 in portions Subareas 23-9 to 23-11. Reopen 06:30 to 19:30 Mar 11. Reopen 06:00 Mar 12 to 06:00 Mar 13. Reopen 06:00 to 11:00 Mar 14.
Gill net	87	1,000	1,042	3.5	Open 14:30 Mar 24 to 12:15 Mar 27 in portion Subarea 25-13.
Prince Rupert:					
Seine	20	1,200	1,383	4.7	Open 08:10 to 16:40 Mar 23 in Subarea 5-5.
Gill Net	215	2,600	2,706	9.2	Mar 28 to 17:00 Mar 30 in Subareas 4-5 to 4-9, portion 4-10 & 4-14.
Total–Sn	**240**	**15,200**	**16,619**	**56.5%**	
Total–Gn	**1,247**	**12,600**	**12,774**	**43.5%**	
Total	**1,487**	**27,800**	**29,393**	**100.0%**	

*Catch numbers are weights validated at the point of landing.

Table 4. 2003 Roe quota and validated landed catch (tons) by gear type and region

Region	Statistical Area	SEINE				GILLNET				TOTAL ROE	
		Quota	# of licences	# of pools (SN)	Validated Catch	Quota	# of licences	# of pools (GN)	Validated Catch	Quota	Validated Catch
QCI	2E	No fishery				No fishery					
Prince Rupert	3-5	1,200	20	2	1,383	2,600	215	8	2,706	3,800	4,089
Central Coast	6-8	2,000	33	3	2,054	300	32	5	319	2,300	2,373
Gulf	14-18	9,800	152	8	10,897	8,700	913	15	8,707	18,500	19,604
WCVI	23-25	2,200	35	3	2,285	1,000	87	7	1,042	3,200	3,327
Total		15,200	240*		16,619	12,600	1,247=		12,774	27,800	29,393

* Number of seine licences does not include 12 licences retired for test fishing
= Number of gillnet licences does not include 8 licences retired for test fishing

Table 5. 2003 Spawn summary by location, date and statistical area.

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 2W: West Coast Q.C.I.							
Surface Survey							
Clonard Bay	01-Apr	01-Apr	1000	5	0.8	100	4.01
Clonard Bay	01-Apr	01-Apr	1000	10	1.25	100	12.5
Clonard Bay	01-Apr	01-Apr	1000	20	3.03	100	60.5
Clonard Bay	01-Apr	01-Apr	1000	20	4.4	100	88
Clonard Bay	01-Apr	01-Apr	1000	5	1.2	100	6.01
Dawson Hrbr	/	/	200	9	2.5	100	4.5
Kano Inlt	20-Mar	20-Mar	600	15	2.15	100	19.35
Otard Bay	02-Apr	02-Apr	1000	75	2.9	100	217.5
Otard Bay	02-Apr	02-Apr	1000	50	2.3	100	115
Seal Inlt	30-Mar	30-Mar	1000	15	2.1	100	31.5
Seal Inlt	30-Mar	30-Mar	1000	15	1.48	100	22.13
Skidegate Chnl W	17-Apr	18-Apr	50	4	0.75	100	0.15
Skidegate Chnl W	17-Apr	18-Apr	120	7	6	100	5.04
Skidegate Chnl W	17-Apr	18-Apr	90	5	0.64	100	0.29
Surface Survey Area Total							**586.47**
Statistical Area 2E: East Coast Q.C.I.							
Surface Survey							
Smithe Pt	22-Feb	23-Feb	3500	25	3.8	100	332.5
Thurston Hrbr	20-Mar	20-Mar	90	20	2.4	100	4.32
Thurston Hrbr	20-Mar	20-Mar	500	60	1.5	100	45
Thurston Hrbr	20-Mar	20-Mar	400	15	0.75	100	4.5
Surface Survey Area Total							**386.32**
Dive Survey							
Harriet Hrbr	05-Apr	08-Apr	700	38	3.14	52	43.53
Harriet Is	06-Apr	09-Apr	800	64	1.81	89	82.63
Bottom				64	1.08	15	8.15
Huston Pt	04-Apr	06-Apr	1100	94	0.59	51	30.88

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Bottom				94	1.17	18	21.97
Macrocystis			1000	160	3.75		83.63
Jedway Bay	03-Apr	08-Apr	500	182	3.18	63	180.58
Kankidas Pt	04-Apr	09-Apr	1400	94	2.72	36	127.14
Bottom				94	1.28	37	62.17
Macrocystis			400	30	4		8.4
Kilmington Pt	05-Mar	08-Mar	500	29	2.33	77	25.94
Bottom				29	1.08	100	15.71
Marshall Inlt	09-Apr	11-Apr	1200	71	0.41	49	17.07
Bottom				71	0.01	2	0.02
Macrocystis			1200	30	2.19		24.81
Marshall Inlt	15-Apr	16-Apr	1300	85	2.34	38	98.88
Newberry Pt	09-Apr	11-Apr	600	66	1.25	36	17.7
Bottom				66	0.67	41	10.8
Macrocystis			600	89	1.63		5.12
Nomad Islet	09-Apr	11-Apr	600	78	1.28	41	24.65
Bottom				78	0.63	22	6.5
Rockfish Hrbr	21-Apr	21-Apr	1400	20	1.57	80	34.19
Bottom				20	0.6	48	7.81
Macrocystis			800	20	1.13		7.39
Traynor Cr	05-Mar	08-Mar	2500	48	1.36	71	115.3
Bottom				48	1.1	39	51.71
Macrocystis			500	15	3		3.94
Traynor Cr	21-Apr	21-Apr	600	18	3.86	94	38.19
Bottom				18	4.38	26	11.81
Werner Pt	31-Mar	02-Apr	1200	68	2.06	30	49.89
Bottom				68	1.91	43	66.8
Macrocystis			800	25	0.63		1.64
Dive Survey Area Total							**1284.93**

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 03: Nass							
Dive Survey							
Cunningham Pass	07-Apr	08-Apr					
Macrocystis			200	1	0		0
Grassy Pt	15-Apr	17-Apr	1050	34	0.52	40	7.49
Stumaun Bay	15-Apr	17-Apr	1400	73	0.63	76	49
Dive Survey Area Total							**56.5**
Statistical Area 04: Skeena							
Dive Survey							
Belletti Pt	02-Apr	04-Apr	2100	169	1.01	33	119.08
Bottom				169	0.56	13	25.42
Big Bay	30-Mar	31-Mar	5600	145	1.2	47	455.17
Bottom				145	0.24	5	9.01
Burnt Cliff Is	02-Apr	04-Apr	2800	92	0.73	46	85.66
Bottom				92	0.52	16	21.96
Butler Cv	14-Apr	17-Apr	1320	94	0.73	63	57.32
Bottom				94	0.01	1	0.01
Macrocystis			2560	38	0.9		7.31
Devastation Is	02-Apr	04-Apr	700	71	0.35	33	5.85
Bottom				71	0.13	7	0.42
Digby Is	02-Apr	06-Apr	2850	96	1.5	42	173.43
Bottom				96	0.64	8	14.13
Duncan Bay	25-Mar	01-Apr	3500	226	2	44	688.53
Bottom				226	0.52	11	45.73
Macrocystis			2730	136	1.86		324.88
Finlayson Is W	03-Apr	04-Apr	1750	35	0.79	30	14.18
Bottom				35	0.14	28	2.39
Flat Top Islets	04-Apr	04-Apr	1400	29	0.87	131	45.37
Bottom				29	0.01	6	0.02
Macrocystis			1400	35	1		10.5
Island Pt	10-Apr	15-Apr	3500	72	0.61	34	52.36

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Bottom				72	0.18	12	5.66
Macrocystis			3500	40	1.48		105.15
Observation Pt	02-Apr	04-Apr	1750	144	0.7	42	74.07
Bottom				144	0.25	0	0.17
Pearl Harbour	02-Apr	04-Apr	3150	58	0.91	66	109.41
Bottom				58	0.01	1	0.01
Reeks Pt	29-Mar	31-Mar	2450	191	1.47	49	335.33
Bottom				191	0.07	5	1.66
Swamp Is	03-Apr	04-Apr	4550	324	0.94	35	483.98
Bottom				324	0.31	24	108.32
Macrocystis			2140	67	2.33		13.32
Tree Bluff	02-Apr	03-Apr	5600	326	1.07	39	764.69
Bottom				326	0.43	12	91.29
Macrocystis			1050	37	2.33		24.01
Dive Survey Area Total							**4275.8**

Statistical Area 05: Greenville-Principe

Dive Survey							
Clamshell Is	04-Apr	05-Apr	1050	41	2.38	46	46.63
Bottom				41	1.45	16	10.06
Gurd Is	03-Apr	08-Apr	9275	78	1.49	38	413.29
Bottom				78	0.84	22	132.41
Gurd Pt	03-Apr	08-Apr	5600	101	2.08	36	426.08
Bottom				101	1.13	24	156.41
Porcher Pen	02-Apr	08-Apr	3850	24	1.21	46	51.65
Bottom				24	0.78	33	23.77
Robert Is	03-Apr	08-Apr	3500	169	1.52	45	401.92
Bottom				169	1.06	18	114.39
Dive Survey Area Total							**1776.61**

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 06: Butedale							
Dive Survey							
Abrams Is	02-Apr	09-Apr	4550	40	3.56	64	413.05
Bottom				40	2.65	56	267.33
Larkin Pt	01-Apr	13-Apr	4200	95	1.54	48	295.77
Bottom				95	1.08	11	45.85
Macrocystis			1750	10	3.15		19.76
Osment Inlt	02-Apr	13-Apr	5250	61	1.34	51	218.18
Bottom				61	0.47	23	34.33
Macrocystis			5250	53	2.6		191.46
Parsons Anch	02-Apr	13-Apr	2800	29	1.33	50	53.55
Bottom				29	0.8	38	24.74
Macrocystis			2800	17	2.43		59.26
Wilby Pt	01-Apr	04-Apr	5600	28	1.51	50	116.41
Bottom				28	0.12	17	3.13
Macrocystis			4900	20	2.21		201.48
Dive Survey Area Total							**1944.3**
Statistical Area 07: Bella Bella							
Dive Survey							
Balagny Pass	14-Apr	15-Apr	150	24	0.63	38	0.85
Bottom				24	0.3	71	0.78
Balagny Pass	14-Apr	15-Apr	700	92	1.05	39	26.61
Bottom				92	0.25	36	5.94
Berry Inlt	14-Apr	15-Apr	4200	24	2.06	36	75.38
Bottom				24	0.94	59	55.19
Bullen Rk	11-Apr	14-Apr	2100	44	2.2	35	69.94
Bottom				44	1.57	53	76.94
Bush Pt	14-Apr	15-Apr	2800	23	1.18	55	40.71
Bottom				23	0.78	86	42.28
Cecilia Is	16-Apr	16-Apr	700	86	2.09	43	54.22
Bottom				86	0.47	35	10.06

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Cultus Snd	04-Apr	06-Apr	700	150	4.43	39	181.9
Cultus Snd	04-Apr	06-Apr					
Macrocystis			75	2	0		0.00
E Higgins Pass	27-Mar	13-Apr	2800	47	0.72	35	33.54
Bottom				47	0.85	39	43.58
Macrocystis			2450	16	3.71		71.76
Fisher Pt	14-Apr	15-Apr	2800	36	2.58	46	118.8
Bottom				36	1.49	77	116.54
Foote Islets	09-Apr	12-Apr	1400	38	2.67	56	80.93
Bottom				38	1.41	41	31.01
Hurricane Is	10-Apr	12-Apr	3500	36	2.78	52	182.71
Bottom				36	1.37	47	81.57
Macrocystis			800	5	3.63		4.57
Ivory Is	15-Apr	15-Apr	1050	14	0.96	42	5.90
Bottom				14	0.13	57	1.10
Kildidt Inlt	01-Apr	01-Apr	100	16	0.88	31	0.44
Bottom				16	1.42	48	1.08
Kittyhawk Grp	12-Apr	12-Apr	500	12	1.36	70	5.46
Bottom				12	1.25	29	2.05
Mathieson Chnl	/	/	4590	19	2.27	53	102.9
Bottom				19	1.8	56	85.48
Mouat Cv	14-Apr	15-Apr	2450	34	2.92	94	225.91
Bottom				34	0.48	48	18.85
Neekas Inlt	04-Apr	04-Apr	2450	10	1.39	38	13.03
Bottom				10	0.94	22	5.21
Princess Alice Is	15-Apr	15-Apr	150	63	0.39	28	1.02
Bottom				63	0.13	19	0.23
Quinoot Pt	16-Apr	17-Apr	1750	33	2.06	62	74.53
Bottom				33	1.09	58	36.8
Shingle Rk	09-Apr	12-Apr	2450	37	2.83	46	119.27
Bottom				37	1.93	66	116.23
Spiller Chnl	31-Mar	08-Apr	7000	22	3.55	53	287.36
Bottom				22	2.57	53	207.14
Stryker Bay	13-Apr	14-Apr	1200	25	3.11	68	62.63
Bottom				25	1.33	63	24.99
Tankeeah River	09-Apr	11-Apr	2450	34	3.67	43	131.04
Bottom				34	2.16	63	114.72
Watch Is	15-Apr	15-Apr	300	56	0.75	30	3.79

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Bottom				56	0.01	39	0.07
Watch Is	15-Apr	15-Apr	1400	27	0.9	48	16.09
Bottom				27	0.44	74	12.17
Dive Survey Area Total							**3081.29**
Statistical Area 08: Bella Coola							
Dive Survey							
Illahie Inlt	28-Mar	05-Apr	12250	33	3.13	31	396.04
Bottom				33	2.21	69	622.85
Illahie Inlt	28-Mar	05-Apr	700	14	2.36	39	9.04
Bottom				14	1.7	83	13.88
Kwakume Inlt	26-Mar	04-Apr	3850	63	3.02	35	258.40
Bottom				63	1.65	40	161.41
Kwakume Pt	29-Mar	04-Apr	700	4	0.88	69	1.68
Bottom				4	1.13	100	3.15
Kwakume Pt	29-Mar	04-Apr	2450	6	1.73	44	11.48
Bottom				6	0.99	75	11.15
Whidbey Pt	31-Mar	01-Apr	1750	4	2.18	48	7.38
Bottom				4	0.82	89	5.08
Whidbey Pt	04-Apr	06-Apr	100	6	2.08	72	0.90
Bottom				6	0.17	100	0.10
Dive Survey Area Total							**1502.54**
Statistical Area 09: Rivers Inlet							
Dive Survey							
Kilbella Bay	02-Apr	03-Apr	2800	13	0.61	46	10.33
Bottom				13	0.38	71	10.00
Kilbella Bay	02-Apr	03-Apr	1050	7	1.04	60	4.37
Bottom				7	0.83	76	4.38
McAllister Pt	02-Apr	06-Apr	7350	19	3	40	166.40
Bottom				19	2.45	66	224.15
Moses Inlt	03-Apr	05-Apr	700	15	0.96	44	4.49
Bottom				15	1.25	48	6.34

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Rivers Inlt Hd	02-Apr	03-Apr	2800	14	0.27	34	3.45
Bottom				14	0.27	48	4.93
Shotbolt Bay	02-Apr	04-Apr	4900	17	0.7	40	22.47
Bottom				17	0.71	54	30.95
Wannock Cove	03-Apr	05-Apr	4200	10	1.51	39	24.64
Bottom				10	0.98	74	30.14
Dive Survey Area Total							**547.07**
Statistical Area 10: Smith Inlet							
Surface Survey							
McBride Bay	17-Mar	21-Mar	142	2	1.9	100	0.54
McBride Bay	17-Mar	21-Mar	69	2	1	100	0.14
McBride Bay	17-Mar	21-Mar	23	4	1.8	100	0.17
McBride Bay	17-Mar	21-Mar	50	2	2	100	0.20
McBride Bay	17-Mar	21-Mar	50	2	1	100	0.10
McBride Bay	17-Mar	20-Mar	100	4	3	100	1.20
McBride Bay	17-Mar	20-Mar	70	2	1	100	0.14
McBride Bay	17-Mar	20-Mar	160	2	1.3	100	0.42
McBride Bay	17-Mar	20-Mar	80	2	1.5	100	0.24
McBride Bay	17-Mar	20-Mar	30	2	2	100	0.12
McBride Bay	17-Mar	20-Mar	67	2	1	100	0.13
McBride Bay	17-Mar	20-Mar	290	2	2	100	1.16
McBride Bay	17-Mar	20-Mar	240	4	1	100	0.96
McBride Bay	17-Mar	20-Mar	70	4	1	100	0.28
McBride Bay	17-Mar	20-Mar	62	2	1	100	0.12
McBride Bay	17-Mar	20-Mar	50	3	2	100	0.30
McBride Bay	17-Mar	20-Mar	80	4	1.9	100	0.61
McBride Bay	17-Mar	20-Mar	40	4	1	100	0.16
McBride Bay	17-Mar	20-Mar	34	4	1.9	100	0.26
McBride Bay	17-Mar	20-Mar	36	6	3	100	0.65
McBride Bay	17-Mar	20-Mar	80	6	1.25	100	0.60
McBride Bay	17-Mar	20-Mar	22	6	1.7	100	0.22
McBride Bay	17-Mar	20-Mar	96	6	2	100	1.15
McBride Bay	17-Mar	20-Mar	22	2	1.8	100	0.08
McBride Bay	17-Mar	20-Mar	60	2	2	100	0.24

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
McBride Bay	17-Mar	20-Mar	43	4	1	100	0.17
McBride Bay	17-Mar	20-Mar	85	6	1	100	0.51
McBride Bay	17-Mar	20-Mar	30	6	1.5	100	0.27
McBride Bay	17-Mar	20-Mar	127	4	2	100	1.02
McBride Bay	17-Mar	20-Mar	84	6	2	100	1.01
McBride Bay	17-Mar	20-Mar	46	8	2	100	0.74
McBride Bay	17-Mar	20-Mar	60	6	3	100	1.08
McBride Bay	17-Mar	20-Mar	59	8	3	100	1.42
McBride Bay	17-Mar	20-Mar	87	2	2	100	0.35
McBride Bay	17-Mar	20-Mar	146	4	1	100	0.58
McBride Bay	17-Mar	20-Mar	28	4	1.5	100	0.17
McBride Bay	17-Mar	20-Mar	109	4	1	100	0.44
McBride Bay	17-Mar	20-Mar	20	4	2	100	0.16
McBride Bay	17-Mar	20-Mar	30	4	2	100	0.24
McBride Bay	17-Mar	20-Mar	23	2	1	100	0.05
McBride Bay	17-Mar	20-Mar	66	2	3.7	100	0.49
McBride Bay	17-Mar	20-Mar	29	6	1	100	0.17
McBride Bay	17-Mar	21-Mar	4	6	1.45	100	0.03
McBride Bay	17-Mar	21-Mar	137	3	1	100	0.41
McBride Bay	17-Mar	21-Mar	13	6	2	100	0.16
McBride Bay	17-Mar	21-Mar	19	8	3	100	0.46
McBride Bay	17-Mar	21-Mar	10	6	3	100	0.18
McBride Bay	17-Mar	21-Mar	10	10	3	100	0.30
McBride Bay	17-Mar	21-Mar	15	4	4	100	0.24
McBride Bay	17-Mar	21-Mar	140	4	3	100	1.68
McBride Bay	17-Mar	21-Mar	20	4	1	100	0.08
McBride Bay	17-Mar	21-Mar	23	3	1	100	0.07
McBride Bay	17-Mar	21-Mar	32	16	3	100	1.54
McBride Bay	17-Mar	21-Mar	10	6	4	100	0.24
McBride Bay	17-Mar	21-Mar	56	4	2	100	0.45
McBride Bay	17-Mar	21-Mar	25	2	2	100	0.10
McBride Bay	17-Mar	21-Mar	28	4	3	100	0.34
McBride Bay	17-Mar	21-Mar	240	4	4	100	3.84
McBride Bay	17-Mar	21-Mar	10	2	3	100	0.06
McBride Bay	17-Mar	21-Mar	46	2	1.4	100	0.13
McBride Bay	17-Mar	21-Mar	175	4	2	100	1.40
McBride Bay	17-Mar	21-Mar	60	8	1	100	0.48
McBride Bay	17-Mar	21-Mar	117	4	2	100	0.94

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
McBride Bay	17-Mar	21-Mar	24	4	3	100	0.29
McBride Bay	17-Mar	21-Mar	126	4	3	100	1.51
McBride Bay	17-Mar	21-Mar	20	8	2	100	0.32
McBride Bay	17-Mar	21-Mar	141	3	1	100	0.42
McBride Bay	17-Mar	21-Mar	65	6	3	100	1.17
McBride Bay	17-Mar	21-Mar	47	2	4	100	0.38
McBride Bay	17-Mar	21-Mar	77	4	2	100	0.62
McBride Bay	17-Mar	21-Mar	70	4	1	100	0.28
McBride Bay	17-Mar	21-Mar	90	4	2	100	0.72
McBride Bay	17-Mar	21-Mar	34	4	3	100	0.41
McBride Bay	17-Mar	21-Mar	45	4	4	100	0.72
McBride Bay	17-Mar	21-Mar	124	4	2	100	0.99
McBride Bay	17-Mar	21-Mar	22	4	3	100	0.26
McBride Bay	17-Mar	21-Mar	85	4	2	100	0.68
McBride Bay	17-Mar	21-Mar	40	4	2	100	0.32
McBride Bay	17-Mar	21-Mar	10	6	1	100	0.06
McBride Bay	17-Mar	21-Mar	124	6	2	100	1.49
McBride Bay	17-Mar	21-Mar	50	4	1	100	0.20
McBride Bay	17-Mar	21-Mar	96	2	2	100	0.38
McBride Bay	17-Mar	21-Mar	50	2	1	100	0.10
McBride Bay	17-Mar	21-Mar	60	2	1	100	0.12
McBride Bay	17-Mar	21-Mar	57	4	2	100	0.46
McBride Bay	17-Mar	21-Mar	90	4	4	100	1.44
McBride Bay	17-Mar	21-Mar	41	6	1	100	0.25
McBride Bay	17-Mar	21-Mar	47	4	2	100	0.38
McBride Bay	17-Mar	21-Mar	90	2	3	100	0.54
McBride Bay	17-Mar	21-Mar	140	2	4	100	1.12
McBride Bay	17-Mar	21-Mar	140	3	4	100	1.68
McBride Bay	17-Mar	21-Mar	55	3	3	100	0.50
McBride Bay	17-Mar	21-Mar	70	3	4	100	0.84
McBride Bay	17-Mar	21-Mar	92	6	1	100	0.55
Surface Survey Area Total							**51.34**

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 12: Alert Bay							
Surface Survey							
Ahnuhati Pt	02-Mar	04-Mar	1000	1	1.48	100	1.48
Ahnuhati Pt	02-Mar	04-Mar	60	15	3.35	100	3.02
Ahnuhati Pt	02-Mar	04-Mar	110	6	2.2	100	1.45
Ahnuhati Pt	02-Mar	04-Mar	85	3	1.95	100	0.50
Axe Pt	02-Mar	04-Mar	550	2	1.9	100	2.09
Axe Pt	02-Mar	04-Mar	150	2	1.9	100	0.57
Axe Pt	02-Mar	04-Mar	633	1	3.8	100	2.41
Axe Pt	02-Mar	04-Mar	320	2	3.6	100	2.30
Axe Pt	02-Mar	04-Mar	30	1	1	100	0.03
Axe Pt	02-Mar	04-Mar	20	2	1	100	0.04
Axe Pt	02-Mar	04-Mar	150	1	1.9	100	0.29
Cattle Is	29-Mar	29-Mar	122	8	0.65	100	0.63
Cattle Is	29-Mar	29-Mar	200	10	5	100	10.00
Deer Bay	02-Mar	04-Mar	337	1	2.45	100	0.83
Deer Bay	02-Mar	04-Mar	175	4	4.7	100	3.29
Deer Bay	02-Mar	04-Mar	200	5	2.8	100	2.80
Deer Bay	02-Mar	04-Mar	100	3	2.8	100	0.84
Deer Bay	02-Mar	04-Mar	448	1	1.95	100	0.87
Deer Bay	02-Mar	04-Mar	1004	1	0.2	100	0.20
Glacier Bay +	01-Apr	02-Apr	20	3	1	100	0.06
Glacier Bay +	01-Apr	02-Apr	60	2	1.48	100	0.18
Glacier Bay +	01-Apr	02-Apr	45	10	2.8	100	1.26
Glacier Bay +	01-Apr	02-Apr	140	5	2.43	100	1.70
Glacier Bay +	01-Apr	02-Apr	30	1	0.53	100	0.02
Glendale Cv	01-Apr	01-Apr	84	2	0.53	100	0.09
Glendale Cv	01-Apr	01-Apr	114	3	1	100	0.34
Kingcome Inlt	03-Apr	04-Apr	735	1	1	100	0.74
Port McNeill	01-Jun	01-Jun	16	8	6	100	0.77
Port McNeill	01-Jun	01-Jun	33	2	2	100	0.13
Port McNeill	01-Jun	01-Jun	21	2	0.95	100	0.04
Rubble Pt	01-Apr	02-Apr	30	2	1.95	100	0.12
Rubble Pt	01-Apr	01-Apr	30	2	1.95	100	0.12
Rubble Pt	01-Apr	02-Apr	60	3	2.8	100	0.50

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Rubble Pt	01-Apr	02-Apr	200	1	2.12	100	0.42
Rubble Pt	02-Mar	04-Mar	10	1	2.38	100	0.02
Rubble Pt	02-Mar	04-Mar	10	1	1.43	100	0.01
Shell Is	29-Mar	29-Mar	160	30	0.25	100	1.20
Thompson Snd	07-Apr	07-Apr	572	2	1.95	100	2.23
Thompson Snd	07-Apr	07-Apr	10	2	1.9	100	0.04
Thompson Snd	07-Apr	07-Apr	80	2	2.35	100	0.38
Thompson Snd	07-Apr	07-Apr	263	1	1	100	0.26
Thompson Snd	07-Apr	07-Apr	60	1	0.53	100	0.03
Thompson Snd	07-Apr	07-Apr	570	3	3.4	100	5.81
Thompson Snd	07-Apr	07-Apr	140	10	2	100	2.80
Thompson Snd	07-Apr	07-Apr	300	1	0.55	100	0.17
Thompson Snd	07-Apr	07-Apr	291	4	2.2	100	2.56
Thompson Snd	07-Apr	07-Apr	130	2	2.4	100	0.62
Thompson Snd	07-Apr	07-Apr	1312	3	2.05	100	8.07
Wahkash Cr	01-Apr	02-Apr	45	1	0.53	100	0.02
Wahkash Cr	01-Apr	02-Apr	30	1	0.5	100	0.02
Wahkash Cr	01-Apr	02-Apr	18	1	1	100	0.02
Wahkash Cr	01-Apr	02-Apr	60	1	1.48	100	0.09
Wahkash Cr	01-Apr	02-Apr	30	2	1	100	0.06
Wahkash Cr	01-Apr	02-Apr	30	2	1	100	0.06
Wahkash Cr	01-Apr	02-Apr	10	1	1	100	0.01
Wahkash Cr	01-Apr	02-Apr	5	1	0.25	100	0.00
Wahkash Cr	02-Mar	04-Mar	30	1	1	100	0.03
Wahkash Cr	02-Mar	04-Mar	100	1	0.5	100	0.05
Wahkash Cr	02-Mar	04-Mar	60	1	1	100	0.06
Wahkash Cr	02-Mar	04-Mar	300	1	0.25	100	0.08
Wahkash Cr	02-Mar	04-Mar	150	1	0.5	100	0.08
Wahkash Cr	02-Mar	04-Mar	907	2	1.35	100	2.45
Wahkash Cr	02-Mar	04-Mar	3574	2	1.4	100	10.01
Wahkash Cr	02-Mar	04-Mar	10	2	1.9	100	0.04
Wahkash Cr	02-Mar	04-Mar	30	4	1.9	100	0.23
Wahkash Cr	02-Mar	04-Mar	60	6	2.6	100	0.94
Wahkash Cr	18-Mar	18-Mar	250	6	4.1	100	6.15
Wahkash Cr	02-Mar	03-Mar	300	4	2.8	100	3.36
Wahkash Cr	18-Mar	18-Mar	60	10	4.4	100	2.64
Wahkash Cr	02-Mar	04-Mar	400	2	1.45	100	1.16
Wahkash Cr	02-Mar	04-Mar	100	2	0.5	100	0.10

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Wahkash Cr	02-Mar	04-Mar	100	1	0.25	100	0.03
Wahshihlas Bay	01-Apr	02-Apr	120	3	1.8	100	0.65
Wahshihlas Bay	01-Apr	02-Apr	200	2	1.9	100	0.76
Wahshihlas Bay	01-Apr	02-Apr	400	2	2.35	100	1.88
Wahshihlas Bay	02-Mar	04-Mar	30	5	2.35	100	0.35
Wahshihlas Bay	02-Mar	04-Mar	210	3	2	100	1.26
Wahshihlas Bay	02-Mar	04-Mar	402	3	3.6	100	4.34
Wahshihlas Bay	02-Mar	04-Mar	507	2	2.38	100	2.41
Wakeman Snd	29-Apr	29-Apr	30	1	2	100	0.06
Wakeman Snd	09-May	09-May	10	10	4	100	0.40
Wakeman Snd	28-Apr	29-Apr	5147	2	2.7	100	27.79
Wakeman Snd	03-Apr	04-Apr	230	20	1	100	4.60
Wakeman Snd	03-Apr	04-Apr	91	12	1	100	1.09
Wakeman Snd	03-Apr	04-Apr	154	18	0.98	100	2.70
Wakeman Snd	03-Apr	04-Apr	4484	2	1.4	100	12.56
Wakeman Snd	03-Apr	04-Apr	6891	2	1.35	100	18.61
Wakeman Snd	03-Apr	04-Apr	1091	2	1.35	100	2.95
Wakeman Snd	14-Mar	15-Mar	70	12	0.25	100	0.21
Wakeman Snd	14-Mar	15-Mar	210	5	1	100	1.05
Wakeman Snd	14-Mar	15-Mar	110	8	0.53	100	0.46
Wakeman Snd	14-Mar	15-Mar	754	5	1	100	3.77
Wakeman Snd	14-Mar	15-Mar	457	2	2	100	1.83
Wakeman Snd	14-Mar	15-Mar	548	3	2.35	100	3.86
Wakeman Snd	14-Mar	15-Mar	548	3	2.35	100	3.86
Wakeman Snd	14-Mar	15-Mar	1543	5	2.7	100	20.83
Wakeman Snd	14-Mar	15-Mar	702	6	3.8	100	16.01
Wakeman Snd	14-Mar	15-Mar	450	15	3.6	100	24.30
Wakeman Snd	14-Mar	15-Mar	963	4	2.58	100	9.92
Wakeman Snd	14-Mar	15-Mar	991	2	1.4	100	2.77
Surface Survey Area Total							**263.26**

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 13: Quathiaski							
Surface Survey							
Bute Inlt	17-Mar	22-Mar	105	3	1	100	0.32
Bute Inlt	17-Mar	22-Mar	87	3	1	100	0.26
Bute Inlt	17-Mar	22-Mar	71	3	3	100	0.64
Bute Inlt	17-Mar	22-Mar	21	3	4	100	0.25
Bute Inlt	17-Mar	22-Mar	162	3	5	100	2.43
Bute Inlt	17-Mar	22-Mar	47	3	4	100	0.56
Bute Inlt	17-Mar	22-Mar	160	3	3	100	1.44
Bute Inlt	17-Mar	22-Mar	82	3	4	100	0.98
Bute Inlt	17-Mar	22-Mar	3	3	4.8	100	0.04
Bute Inlt	17-Mar	22-Mar	20	3	4	100	0.24
Bute Inlt	17-Mar	22-Mar	17	3	2	100	0.10
Bute Inlt	17-Mar	22-Mar	91	3	4	100	1.09
Bute Inlt	17-Mar	22-Mar	120	3	3	100	1.08
Bute Inlt	17-Mar	22-Mar	29	3	2	100	0.17
Bute Inlt	17-Mar	22-Mar	47	3	3	100	0.42
Bute Inlt	17-Mar	22-Mar	27	3	2	100	0.16
Bute Inlt	17-Mar	22-Mar	195	3	3	100	1.76
Bute Inlt	17-Mar	22-Mar	380	3	4	100	4.56
Bute Inlt	17-Mar	22-Mar	230	3	4	100	2.76
Bute Inlt	17-Mar	22-Mar	135	3	1	100	0.41
Bute Inlt	17-Mar	22-Mar	205	3	1	100	0.62
Frazer Bay	17-Mar	20-Mar	20	4	1	100	0.08
Hamilton Pt	17-Mar	22-Mar	170	4	1	100	0.68
Hamilton Pt	17-Mar	22-Mar	277	6	1	100	1.66
Hamilton Pt	17-Mar	22-Mar	15	6	2	100	0.18
Hamilton Pt	17-Mar	22-Mar	190	6	1	100	1.14
Hamilton Pt	17-Mar	22-Mar	10	6	3	100	0.18
Hamilton Pt	17-Mar	22-Mar	200	3	2	100	1.20
Hamilton Pt	17-Mar	22-Mar	570	3	3	100	5.13
Hamilton Pt	17-Mar	22-Mar	143	3	2	100	0.86
Hamilton Pt	17-Mar	22-Mar	193	3	3	100	1.74
Hamilton Pt	17-Mar	22-Mar	190	3	1	100	0.57
Hamilton Pt	17-Mar	22-Mar	62	3	1	100	0.19
Hamilton Pt	17-Mar	22-Mar	90	3	1	100	0.27

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Waddington Hrbr	17-Mar	22-Mar	1000	5	1	100	5.00
Ward Pt	17-Mar	21-Mar	112	3	1	100	0.34
Ward Pt	17-Mar	21-Mar	115	3	2	100	0.69
Ward Pt	17-Mar	21-Mar	60	4	3	100	0.72
Ward Pt	17-Mar	21-Mar	47	4	4	100	0.75
Ward Pt	17-Mar	21-Mar	55	4	3	100	0.66
Ward Pt	17-Mar	21-Mar	75	4	2	100	0.60
Ward Pt	17-Mar	21-Mar	88	6	1	100	0.53
Ward Pt	17-Mar	21-Mar	90	3	1	100	0.27
Ward Pt	17-Mar	21-Mar	25	3	2	100	0.15
Ward Pt	17-Mar	21-Mar	210	3	3	100	1.89
Ward Pt	17-Mar	21-Mar	73	3	2	100	0.44
Ward Pt	17-Mar	21-Mar	14	3	1	100	0.04
Ward Pt	17-Mar	21-Mar	12	3	2	100	0.07
Ward Pt	17-Mar	21-Mar	185	3	1	100	0.56
Ward Pt	17-Mar	21-Mar	75	8	2	100	1.20
Ward Pt	17-Mar	21-Mar	531	3	2	100	3.19
Ward Pt	17-Mar	21-Mar	165	3	1	100	0.50
Ward Pt	17-Mar	21-Mar	46	3	2	100	0.28
Ward Pt	17-Mar	21-Mar	117	3	1	100	0.35
Ward Pt	17-Mar	21-Mar	12	3	1	100	0.04
Ward Pt	17-Mar	21-Mar	236	3	2	100	1.42
Ward Pt	17-Mar	21-Mar	113	3	1	100	0.34
Ward Pt	17-Mar	21-Mar	160	3	1	100	0.48
Ward Pt	17-Mar	21-Mar	15	3	2	100	0.09
Ward Pt	17-Mar	21-Mar	506	3	1	100	1.52
Ward Pt	17-Mar	21-Mar	300	6	1	100	1.80
Surface Survey Area Total							**58.06**

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Statistical Area 14: Comox							
Dive Survey							
Big Qualicum Rvr	14-Mar	20-Mar	7000	296	2.4	29	1437.56
Bottom				296	1.55	12	372.60
Bowser	16-Mar	19-Mar	4900	268	2.34	42	1282.73
Bottom				268	1.62	23	494.97
Boyle Pt	17-Mar	19-Mar	4550	56	2.75	36	255.46
Bottom				56	1.83	31	144.17
Cape Lazo	23-Mar	/	8050	453	1.14	31	1274.16
Bottom				453	0.2	37	274.62
Collishaw Pt	15-Mar	17-Mar	4900	242	2.39	35	990.44
Bottom				242	0.64	6	41.53
Columbia Beach	23-Mar	/	4200	353	1.19	51	906.53
Bottom				353	0.01	6	0.84
Cottam Pt	23-Mar	/	1890	88	1	41	67.25
Bottom				88	0.84	29	40.86
Denman Is W	18-Mar	19-Mar	6650	24	4.14	46	302.76
Bottom				24	1.75	18	50.24
Downes Pt	19-Mar	19-Mar	4550	79	2.22	34	268.92
Bottom				79	1.28	18	83.02
Englishman Rvr	23-Mar	/	3190	247	1.36	34	364.68
Bottom				247	1.28	13	134.81
Fanny Bay	19-Mar	20-Mar	350	36	2.29	50	14.4
Fillongley Park	12-Mar	20-Mar	3500	525	3.05	27	1522.61
Bottom				525	0.97	15	264.57
Ford Cv	17-Mar	19-Mar	2800	93	2.38	40	246.24
Bottom				93	1.5	18	71.14
French Cr	23-Mar	/	3500	342	1.53	39	710.12
Bottom				342	0.44	30	160.24
Gravelly Bay	17-Mar	20-Mar	2450	62	4.45	47	321.09
Bottom				62	1.43	28	60.01
Henry Bay	22-Mar	/	4590	83	3.58	43	593.93
Bottom				83	1.57	26	159.18
Komas Bluff	23-Mar	/	7000	510	1.82	25	1596.62
Bottom				510	1.18	30	1251.04
Little Qualicum Rvr	14-Mar	20-Mar	2450	84	0.95	27	53.14

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Bottom				84	0.01	2	0.03
Madrona Pt	23-Mar	/	2275	207	1.37	43	275.72
Bottom				207	0.48	39	86.95
Mapleguard Pt	16-Mar	19-Mar	4200	342	2.68	34	1294.10
Bottom				342	0.96	12	161.43
Metcalf Bay	17-Mar	19-Mar	3150	86	2.66	35	255.17
Bottom				86	1.46	12	45.86
Mud Bay (Baynes)	19-Mar	20-Mar	700	254	2.3	35	141.26
Bottom				254	1.17	8	17.00
Norman Pt	19-Mar	19-Mar	3150	139	2.97	44	569.14
Bottom				139	1.2	21	109.49
Northwest Bay	23-Mar	/	2700	118	1.24	44	174.00
Bottom				118	0.76	39	92.94
Nuttal Bay	23-Mar	/	2470	253	1.36	34	289.71
Bottom				253	0.5	49	153.29
Parksville Bay	23-Mar	/	1750	468	1.5	39	478.37
Bottom				468	1.79	19	271.05
Qualicum Bay	17-Mar	20-Mar	3150	206	2.69	21	366.15
Bottom				206	1.1	2	17.31
Qualicum Beach	18-Mar	20-Mar	5600	216	1.72	30	627.17
Bottom				216	0.67	1	9.00
Rathtrevor Beach	23-Mar	/	2170	65	0.17	83	20.07
Repulse Pt	23-Mar	/	3890	153	2.55	44	670.29
Bottom				153	1.27	17	126.84
Seal Islets	16-Mar	18-Mar	350	617	6.27	23	312.67
Bottom				617	7	18	273.26
Shingle Spit	17-Mar	19-Mar	2800	150	3.43	38	549.52
Bottom				150	0.75	4	12.93
Ship Pt	19-Mar	20-Mar	2450	96	2.39	40	222.68
Bottom				96	2.5	11	65.19
Tralee Pt	15-Mar	19-Mar	3850	68	1.85	33	159.10
Bottom				68	0.86	2	4.62
Tribune Bay	16-Mar	23-Mar	3150	64	3.46	48	331.45
Bottom				64	2.14	24	104.40
Whalebone Pt	16-Mar	20-Mar	5250	158	5.08	48	2010.78
Bottom				158	1.93	26	410.89
Whaling Station Bay	16-Mar	16-Mar	1750	132	1.19	32	89.42
Bottom				132	1	2	4.88

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Dive Survey Area Total							**26616.61**
Statistical Area 15: Westview							
Surface Survey							
Toba Inlt	17-Mar	21-Mar	138	3	1	100	0.41
Toba Inlt	17-Mar	21-Mar	116	3	2	100	0.70
Toba Inlt	17-Mar	21-Mar	240	3	1	100	0.72
Toba Inlt	17-Mar	21-Mar	106	2	1	100	0.21
Toba Inlt	17-Mar	21-Mar	55	2	1	100	0.11
Toba Inlt	17-Mar	21-Mar	55	2	2	100	0.22
Toba Inlt	17-Mar	21-Mar	205	2	5	100	2.05
Toba Inlt	17-Mar	21-Mar	57	2	3	100	0.34
Toba Inlt	17-Mar	21-Mar	41	2	3	100	0.25
Toba Inlt	17-Mar	21-Mar	44	2	1	100	0.09
Toba Inlt	17-Mar	21-Mar	61	2	1	100	0.12
Toba Inlt	17-Mar	21-Mar	30	2	2	100	0.12
Toba Inlt	17-Mar	21-Mar	30	2	3	100	0.18
Toba Inlt	17-Mar	21-Mar	97	2	3	100	0.58
Toba Inlt	17-Mar	21-Mar	34	2	4	100	0.27
Toba Inlt	17-Mar	21-Mar	177	2	2	100	0.71
Toba Inlt	17-Mar	21-Mar	133	2	3	100	0.80
Toba Inlt	17-Mar	21-Mar	42	2	3	100	0.25
Toba Inlt	17-Mar	21-Mar	87	2	3	100	0.52
Toba Inlt	17-Mar	21-Mar	181	2	4	100	1.45
Toba Inlt	17-Mar	21-Mar	123	2	5	100	1.23
Toba Inlt	17-Mar	21-Mar	31	2	4	100	0.25
Toba Inlt	17-Mar	21-Mar	25	2	3	100	0.15
Toba Inlt	17-Mar	21-Mar	38	2	3	100	0.23
Toba Inlt	17-Mar	21-Mar	28	2	2	100	0.11
Toba Inlt	17-Mar	21-Mar	27	2	4	100	0.22
Toba Inlt	17-Mar	21-Mar	21	2	3	100	0.13
Toba Inlt	17-Mar	21-Mar	150	2	4	100	1.20
Toba Inlt	17-Mar	21-Mar	60	2	3	100	0.36
Toba Inlt	17-Mar	21-Mar	89	2	2	100	0.36
Toba Inlt	17-Mar	21-Mar	30	2	3	100	0.18

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Toba Inlt	17-Mar	21-Mar	170	2	2	100	0.68
Toba Inlt	17-Mar	21-Mar	372	2	2	100	1.49
Surface Survey Area Total							**16.68**
Statistical Area 17: Nanaimo							
Dive Survey							
Blunden Pt	23-Mar	/	3890	98	0.82	80	250.35
Boat Hrbr	19-Mar	20-Mar	1750	62	3.87	34	142.91
Bottom				62	1.82	29	58.04
Breakwater Is	/	/	1680	100	1.26	30	64.45
Bottom				100	1.21	33	67.88
Cedar Ramp +	19-Mar	20-Mar	2800	85	3.31	36	286.07
Bottom				85	1.55	13	47.32
Coffin Pt (Is)	22-Mar	25-Mar	1400	34	0.61	44	12.71
De Courcy Is	23-Mar	/	7960	72	4.95	34	975.15
Bottom				72	3.12	27	482.86
Degnen Bay	/	/	2300	211	3.31	36	585.61
Bottom				211	2	16	159.46
Departure Bay	18-Mar	20-Mar	2100	12	2.77	36	25.24
Bottom				12	0.88	5	1.02
Dodd Nrws S	19-Mar	20-Mar	1050	16	0.51	17	1.39
Bottom				16	0.5	5	0.41
Dorcas Pt	23-Mar	/	3400	29	0.57	51	29.00
Bottom				29	0.43	52	22.20
False Nrws	23-Mar	/	1050	69	1.64	35	41.24
Bottom				69	2	15	21.58
False Nrws	/	/	1400	307	1.68	14	103.12
Bottom				307	1.13	20	97.13
Flewett Pt	19-Mar	20-Mar	1400	81	2.48	33	93.47
Bottom				81	2.19	42	105.13
Gabriola Is S	/	/	3080	134	2.41	26	260.21
Bottom				134	1.66	17	114.90
Hammond Bay	23-Mar	/	2800	34	1.88	56	100.41
Bottom				34	0.13	45	5.57
Horswell Bluff	23-Mar	/	2730	58	2.03	43	137.80

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Bottom				58	0.75	29	34.45
Icarus Pt	23-Mar	/	3190	308	1	66	652.48
Bottom				308	0.5	6	29.48
Kulleet Bay	22-Mar	25-Mar	5600	48	0.98	36	93.13
Bottom				48	1.06	5	12.82
Lagoon Hd	23-Mar	/	1330	101	0.77	59	61.05
Bottom				101	0.25	10	3.37
Lantzville	23-Mar	/	2380	89	0.68	50	73.06
Bottom				89	0.01	6	0.13
Link Is	23-Mar	/	1400	95	2.82	35	128.92
Bottom				95	1.18	30	46.16
Link Is	20-Mar	20-Mar	400	12	4.13	30	5.95
Bottom				12	3.2	23	3.55
McKay Pt	23-Mar	/	2100	112	0.91	45	95.00
Bottom				112	0.25	32	18.88
Mudge Is	19-Mar	20-Mar	2800	33	4.33	27	107.83
Bottom				33	3.9	21	77.93
Nankivell Pt	23-Mar	/	2600	124	2.27	44	319.44
Bottom				124	1.49	79	378.76
Nanoose Bay	23-Mar	/	3850	53	0.41	48	39.40
Bottom				53	0.01	6	0.12
Nanoose Bay Hd	23-Mar	/	2140	109	0.22	63	32.26
Nares Pt	23-Mar	/	2100	59	0.51	65	40.80
Neck Pt	23-Mar	/	1150	18	0.27	47	2.59
Bottom				18	0.12	36	0.86
Protection Is E	23-Mar	/	1790	48	1.13	43	41.09
Bottom				48	0.6	29	15.16
Pylades Is	19-Mar	20-Mar	1050	12	1.45	26	4.66
Bottom				12	1.33	7	1.18
Ranch Pt	23-Mar	/	3540	50	1.42	26	66.36
Bottom				50	0.38	13	8.93
Round Is	19-Mar	20-Mar	700	31	3.3	24	17.06
Bottom				31	5.8	32	40.01
Ruxton Is	19-Mar	20-Mar	3500	45	2.51	29	116.08
Bottom				45	1.46	11	25.79
Schooner Cv	23-Mar	/	1960	96	1.12	23	48.51
Bottom				96	0.09	16	2.72
Scar Is	/	/	1350	57	1.77	35	47.74

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Bottom				57	0.65	23	11.29
Sunrise Beach +	23-Mar	/	2350	62	0.8	44	50.40
Bottom				62	0.25	5	1.98
Valdes Is	/	/	1350	152	0.78	26	41.86
Bottom				152	1	27	55.78
Wallis Pt	23-Mar	/	4130	129	1.4	49	365.39
Bottom				129	0.71	43	162.61
Yellow Pt	19-Mar	22-Mar	3500	72	2.51	34	214.92
Bottom				72	1.53	16	62.31
Yellow Pt N	19-Mar	20-Mar	2380	43	2.41	38	93.12
Bottom				43	2.06	12	24.11
Yellow Pt N	19-Mar	20-Mar	560	18	1.17	34	3.98
Bottom				18	1.17	19	2.20
Dive Survey Area Total							**8076.32**

Statistical Area 23: Barkley Sound

Dive Survey							
David Is	12-Mar	13-Mar	1050	63	0.78	31	15.85
Bottom				63	1.15	32	24.49
David Is	25-Mar	27-Mar	350	164	1.5	18	15.61
Bottom				164	1.85	31	32.61
Forbes Is	21-Feb	26-Feb	370	879	0.62	12	24.41
Bottom				879	0.92	33	99.44
Macoah Pass	11-Mar	13-Mar	3150	122	0.38	41	59.61
Bottom				122	0.12	40	18.66
Maggie Rvr	11-Mar	13-Mar	2450	84	0.42	40	34.59
Bottom				84	0.49	15	15.29
Ottaway Islet	12-Mar	14-Mar	1400	58	1.59	36	45.64
Bottom				58	0.79	37	23.61
St Ines Is	12-Mar	25-Mar	2800	227	3.27	21	431.97
Bottom				227	3.08	29	567.17
Toquart Bay	11-Mar	13-Mar	1050	61	0.01	30	0.19
Two Rivers +	12-Mar	14-Mar	1400	159	0.02	38	1.92
Bottom				159	0.13	16	4.70

Spawning Ground	Spawn Date Start	Spawn Date End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Dive Survey Area Total							**1415.77**
Statistical Area 24: Clayoquot Sound							
Dive Survey							
Antons Spit	31-Mar	03-Apr	350	27	0.01	78	0.07
Hesquiat Hrbr	31-Mar	03-Apr	1050	97	0.09	69	6.07
Bottom				97	0.01	3	0.03
Holmes Inlt	11-Mar	12-Mar	1210	55	0.78	19	9.93
Bottom				55	0.67	34	15.18
Hot Springs Cv	31-Mar	03-Apr	7350	45	2.22	32	235.70
Bottom				45	1.52	25	125.04
Macrocystis			350	53	5		4.33
Young Bay	11-Mar	12-Mar	1435	93	1.76	17	39.47
Bottom				93	1.59	23	48.62
Dive Survey Area Total							**484.43**
Statistical Area 25: Nootka Sound							
Dive Survey							
Inner Nuchatlitz	25-Mar	27-Mar	3025	245	3.68	35	948.78
Bottom				245	1.67	25	311.54
Macrocystis			1850	20	3.67		81.78
Outer Nuchatlitz	24-Mar	28-Mar	4480	331	2.72	24	983.57
Bottom				331	1.19	37	647.40
Macrocystis			350	45	3.8		9.00
Port Langford	25-Mar	29-Mar	6150	244	4.13	21	1311.55
Bottom				244	2.9	27	1191.94
Macrocystis			1750	16	4		73.62
Rosa Hrbr	29-Mar	30-Mar	2100	33	0.89	47	28.58
Bottom				33	0.51	50	17.37
Macrocystis			1785	14	2.38		21.03
Rosa Is	27-Mar	30-Mar	1155	95	2.27	27	67.32
Bottom				95	0.5	5	2.53

Spawning Ground	Spawn Date Start	End	Length (m)	Width (m)	Layers	Cover %	S.A.I.
Macrocystis			350	2	3		3.15
Dive Survey Area Total							**5699.18**
Statistical Area 27: Quatsino Sound							
Dive Survey							
Forward Inlt	29-Mar	30-Mar	2150	43	0.82	57	43.45
Bottom				43	0.05	20	0.94
Macrocystis			1470	28	1		16.93
Hazard Pt	29-Mar	30-Mar	300	19	1.98	53	5.91
Matthews Is	27-Mar	28-Mar	1100	13	1.17	40	6.70
Bottom				13	0.01	7	0.01
Macrocystis			1100	11	1		2.29
Moores Is	25-Mar	28-Mar	1100	22	2.1	54	26.99
Bottom				22	0.38	18	1.64
North Hrbr	25-Mar	28-Mar	750	13	2.34	33	7.47
Quashtin Cr	25-Mar	28-Mar	3200	33	0.75	42	33.15
Bottom				33	0.17	5	0.98
Dive Survey Area Total							**146.48**

Table 6. 2003 SOK Licences and landed product weight (lbs.) by statistical area and location.

Geographic and Statistical area	Harvest Location	# of licences	Spawn-on-Kelp Quota (lbs.)	Harvest (lbs.)
Queen Charlotte Islands				
Area 2E	Huston Inlet			20,431
	Selwyn Inlet			27,839
	Jedway Pass / Nomad Island			111,837
	Skaat Harbour			8,852
Area subtotal		**10**	**170,523**	**168,959**
Prince Rupert				
Area 4	Big Bay	7	105,558	27,518
	Pearl Harbour			1,778
	Venn Pass			25,162
	Island Point			32,744
	Tugwell Island			8,973
	Flat top islands			4,059
Area 5	North Gurd Island	3	45,506	45,134
Area subtotal		**10**	**151,064**	**149,273**
Central Coast				
Area 6/7/8	Powel Anchorage	4	64,330	44,150
	Higgins Pass			6,786
	Kitasu Bay			3,316
	Marvin Islands			9,186
	Kwakume/Spiller/Cultus	9	231,021	240,021
	Illahie Inlet	2	31,420	32,214
Area 10/12	Takush/Beaver harbour	4	68,701	65,399
Area Subtotal		**19**	**395,472**	**401,072**
WCVI				
Area 23/24/25/27	Rosa Harbour	7		34,118
	Young Bay			7,195
	Port Langford / Rosa Harbour			15,252
	Winter Harbour			29,007
Area Subtotal		**7**	**106,083**	**85,572**
Coastwide Total			**823,142**	**804,876**

Table 7. 2002 Catch and allocation (tons) for food and bait, ZX, ZY charity and aquarium use by statistical area.

	Area 4	Area 12	Area 13	Area 14	Area 16	Area 17	Area 18	Total Catch	Allocated
St. of Georgia Winter Food and Bait				130.0		428.6		558.6	900
Fjord ZY						202.7		202.7	200
Walcan ZY			10.00	144.0		117.0		271.0	300
Charity			54.00			113.0		167.0	275
Aquarium						80.36		80.36	110
ZX Personal Use Bait	0.913	0.285						1.198	55
ZY Other Use Bait	5.00		31.13	1.95	10.84	2.80	0.06	51.78	220
Totals:	**5.913**	**0.285**	**95.13**	**275.95**	**10.84**	**944.46**	**0.06**	**1,332.6**	**2,060**

Table 8. 2003 Test fishing vessels by category.

# of Vessels	Category	Vessel Names	Region Worked	Licence Required	Payment Type
3	Assessment Vessels	Lasqueti Star	Central	GN	Seine Fish
		Styrian Knight	Gulf	GN	Seine Fish
		Free to Wander	Gulf	GN	Seine Fish
1	Dive Spawn Survey*	Haida Provider	QCI	GN	Seine Fish
4	GN Test / Dive Spawn Survey	Royal Pride	Rupert	GN	Gillnet Fish
		Ocean Explorer	Central	GN	Seine Fish
		Silver Viking	Gulf	GN	Gillnet and Seine Fish
		Thunder No.1	Gulf	GN	Gillnet and Seine Fish
2	Surface Spawn Survey	Port Lincoln	Area 12	None	Cash
		Discovery Huntress	Area 13	None	Cash
3	Seine Test / Dive Spawn Survey*	Christav	Central	SN	Seine Fish
		Royal Viking	WCVI	SN	Seine Fish
		Viking Joy	WCVI	SN	Seine Fish
11	Seine Test	Queens Reach	QCI	SN	Seine Fish
		Viking Pride	QCI	SN	Seine Fish
		Ocean Venture	Rupert	SN	Seine Fish
		Karenora	Rupert	SN	Seine Fish
		Kynoe	Central	SN	Seine Fish
		Pachena No.1	Gulf/Central	SN	Seine Fish
		Bernice C	Gulf	SN	Seine Fish
		Royal Mariner	Gulf	SN	Seine Fish
		Pacific Skye	Gulf	None	Seine Fish
		Savage Fisher	Gulf	None	Seine Fish
		Ocean Horizon	WCVI	SN	Seine Fish
1	Coded Wire Tagging	Ocean Marauder	Gulf /CC/ Rupert	None	Seine Fish

* All dive spawn survey vessels supplied 4 WCB approved "occupational scuba" certified divers.

Table 9. 2003 Test fishing vessels, dates of operations, and payment requirements (tons).

Area	Vessel	Captain	Dates	Duration (days)	Rate	Payment Location	Total (Tons)
2E	Queens Reach	Legate	Feb 28 - Mar 28	29	4.19	Rupert	121.51
2W	Viking Pride	Olsen	Mar 10 - Apr 08	30	4.05	Gulf	121.5
Dive Platform	Haida Provider	Brillon	Mar 15 - Apr 25	28	3.40	WCVI	95.2
Rupert	Karenora	Smith	Mar 11 - Apr 05	26	4.06	Rupert	105.56
Rupert	Ocean Venture	Budden	Mar 12 - Apr 06	26	4.69	Rupert	121.94
Rupert - GN^	Royal Pride	Malcolm	Mr 5 - Mr 7 Mar 10-Apr 15	45	2.85 GN 3.30 SN	Rupert	128.25
Central	Kynoc	Wilson	Mar 02 - Mar 31	30	4.22	Central	126.6
Central ^	Christav	Stava	Mar 09 - Apr 19	42	4.35	Central	182.7
Central	Lasqueti Star	Heskin	Mar 09 - Apr 03	26	2.75	Central	71.5
Central - GN^	Ocean Explorer	Mydske	Mar 15 - Apr 20	37	3.98 SN	Central	147.26
Gulf	Bernice C	Melan	Feb 20-Mar 19	28	4.31	Gulf	117.38
Gulf	Royal Mariner	Farac	Feb 24- Mar 23	28	4.1	Gulf	114.8
Gulf / CC	Pachena No. 1	Ponak	Feb 24 – Mar 9 Mar 10- Mar 26	31	3.89	Gulf	120.59

Table 9. Continued

Area	Vessel	Captain	Dates	Duration (days)	Rate	Payment Location	Total (Tons)
Gulf	Savage Fisher	Car	Feb 26 – Mar 26	29	1.60	Gulf	46.4
Gulf	Pacific Skye	Ashton	Mar 01 – Mar 26	26	1.61	Gulf	41.86
Gulf (seine)	Styrian Knight	Pierce	Feb 25 - Mar 17	21	2.90	Gulf	60.9
Gulf (gillnet)	Free to Wander	Widsten	Feb 28 - Mar 23	24	2.78	Gulf	66.72
Gulf - GN ^	Thunder No. 1	Hegglund	Mar 02 - Apr 04	34	3.15 GN 4.10 SN	Gulf	125.592
Gulf - GN ^	Silver Viking	Wing	Mar 02 - Apr 04	34	3.02 GN 3.64 SN	Gulf	103.97
CWT	Ocean Marauder	Lenic	Mar 03 - Apr 04	30	3.10	Gulf	93
Area 12	Port Lincoln	Neidrauer		30	$625		$18,750
Area 13	Dis. Huntress	Bunn		30	$625		$18,750
WCVI	Ocean Horizon	Johnson	Feb 21 - Mar 22	30	3.94	WCVI	118.2
WCVI ^	Royal Viking	Holkestad	Feb 26 - Apr 07	41	4.19	WCVI	171.79
WCVI ^	Viking Joy	Houston	Feb 26 - Apr 07	41	3.74	WCVI	153.34
Area 27	Nita Maria	Vogrig	Feb 28 - Mar 13	14	1.64	Rupert	22.96

QCI = Queen Charlotte Islands; Rupert = Prince Rupert Division; Central = Central Coast; Gulf = Strait of Georgia; WCVI = West Coast Vancouver Island; ^ dive & test

Table 10. 2003 Test fish payment requirement by region and catch (tons) by location

Region	Stat Area	Herring Section	Location	Gear	Catch (tons)	Requirement (tons)
Prince Rupert	4	042	Duncan Bay / Tree Bluff	Gillnet	118.504	
	5	052	Gurd Point	Seine	210.517	
			Prince Rupert Total:		**329.021**	**500.22**
Central Coast	7	077	East Higgins	Seine	479.81	528.06
Strait of Georgia	14	143	Wall Beach / Madrona Pt / Bowser	Gillnet	122.732	
	14	142	Sandy Island	Seine	864.41	
			Strait of Georgia Total:		**987.142**	**1,012.712**
WCVI	25	253	Esperanza	Seine	548.799	538.53
				COASTWIDE TOTALS	**2,344.77**	**2,579.52**

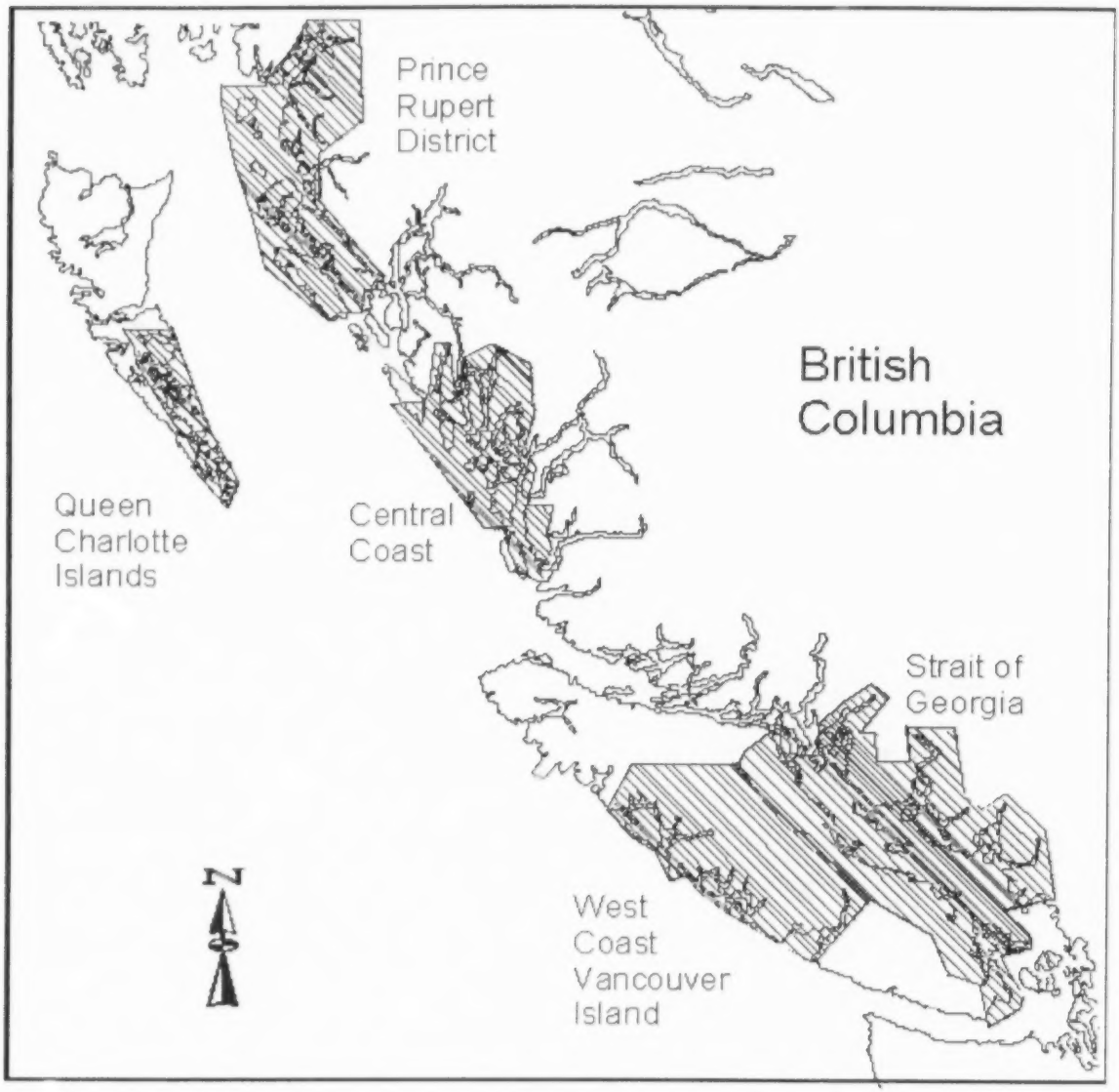

Figure 1. Herring stock assessment regions in British Columbia

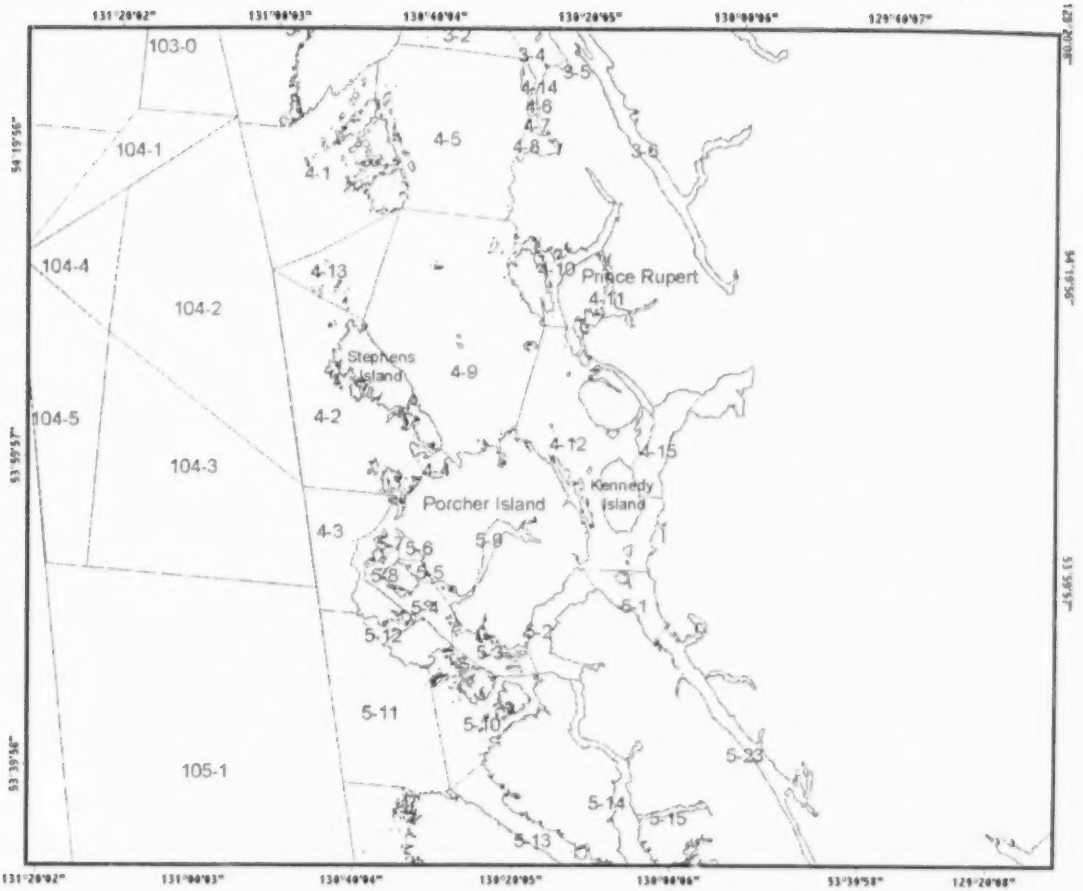

Figure 2. Subareas open for 2003 Prince Rupert roe herring seine fishery: 5-5. Subareas open for the 2003 gillnet fishery: 4-5 to 4-9 and portions of 4-10 and 4-14.

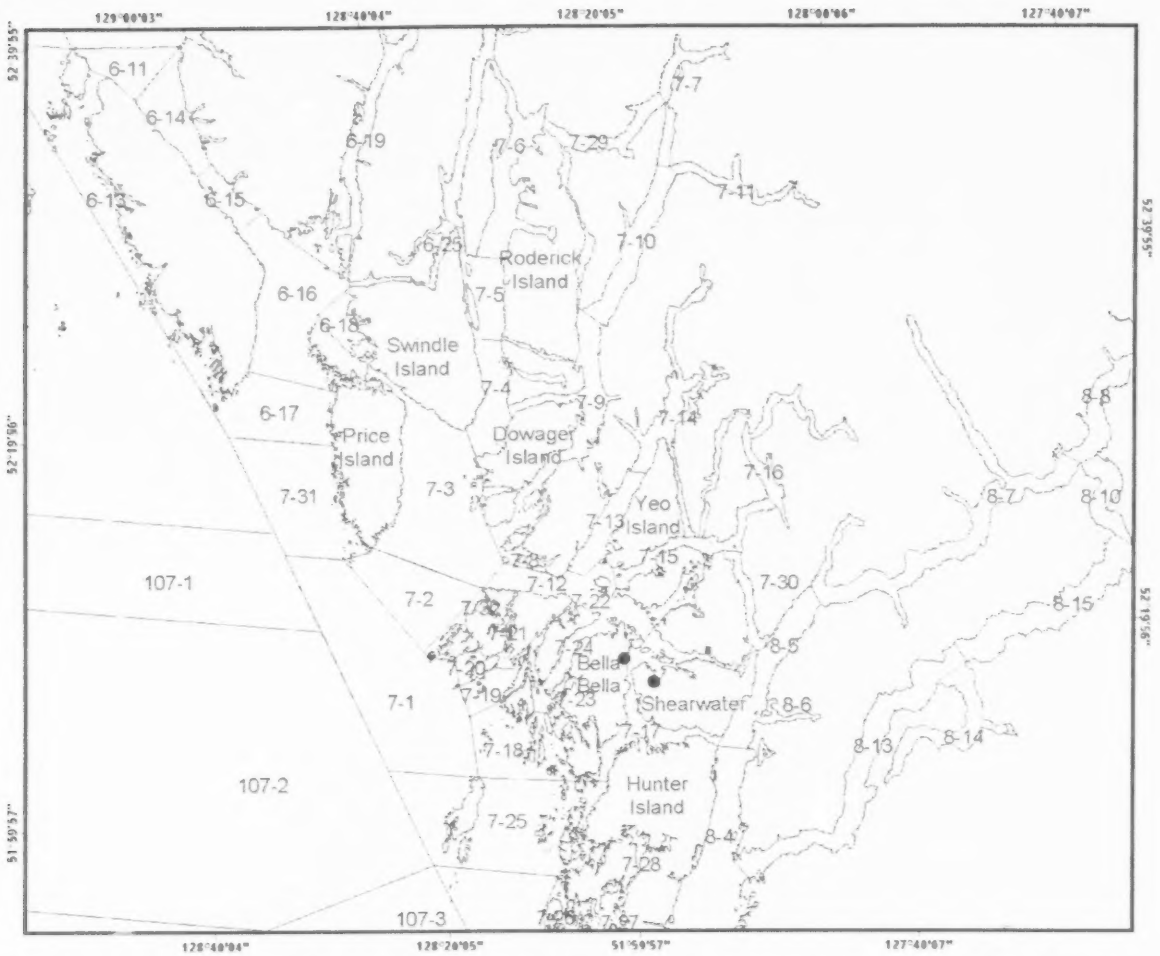

Figure 3. Subareas open for the 2003 Central Coast roe herring seine fishery: 7-3 and 6-16. Subareas open for the 2003 gillnet fishery: 6-16, 6-17 and portions of 7-3.

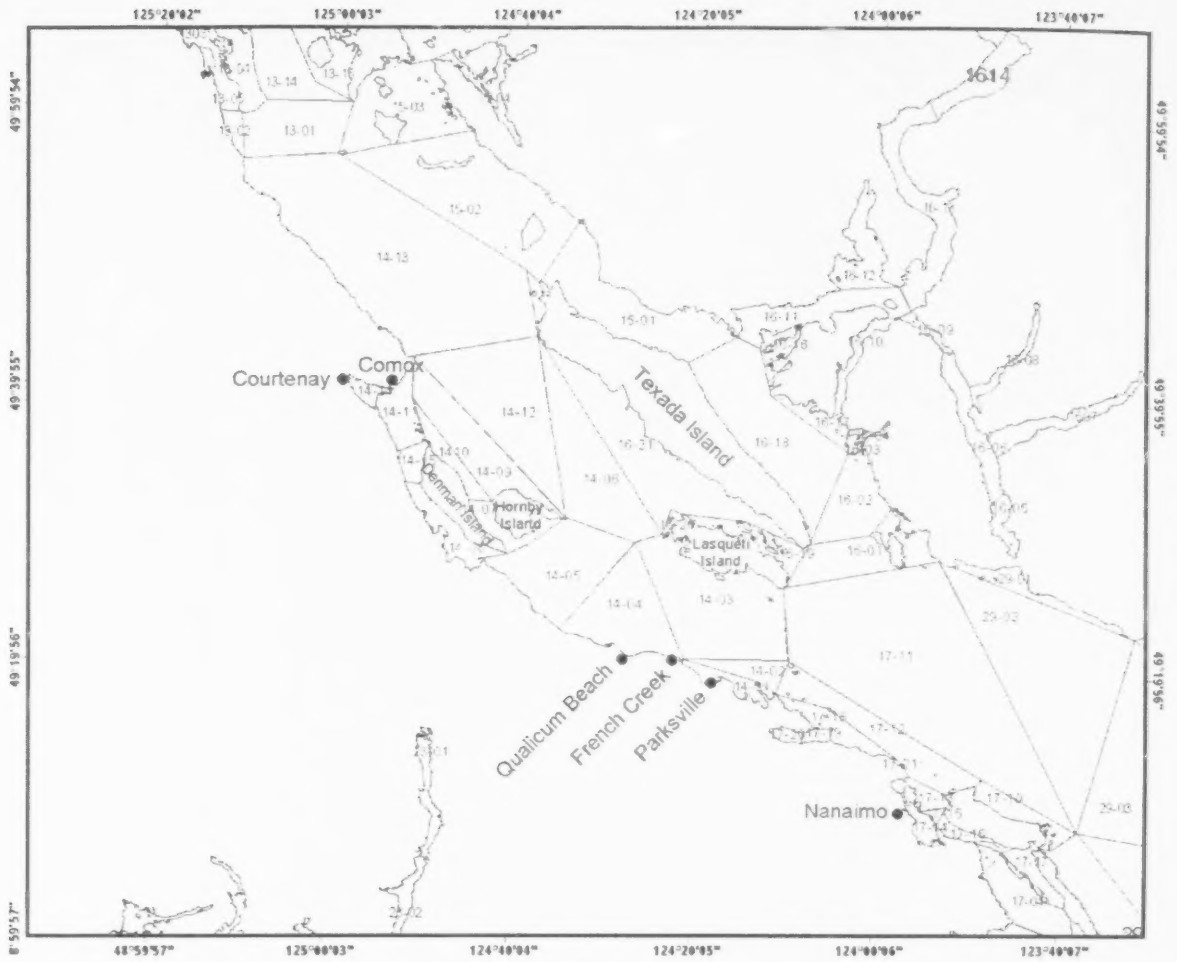

Figure 4. Subareas open for the 2003 Strait of Georgia roe herring seine fishery: 14-8, 14-11, 14-14 and 14-15. Subareas open for the 2003 gillnet fishery: Area 14 and area 17 excluding subarea 17-20.

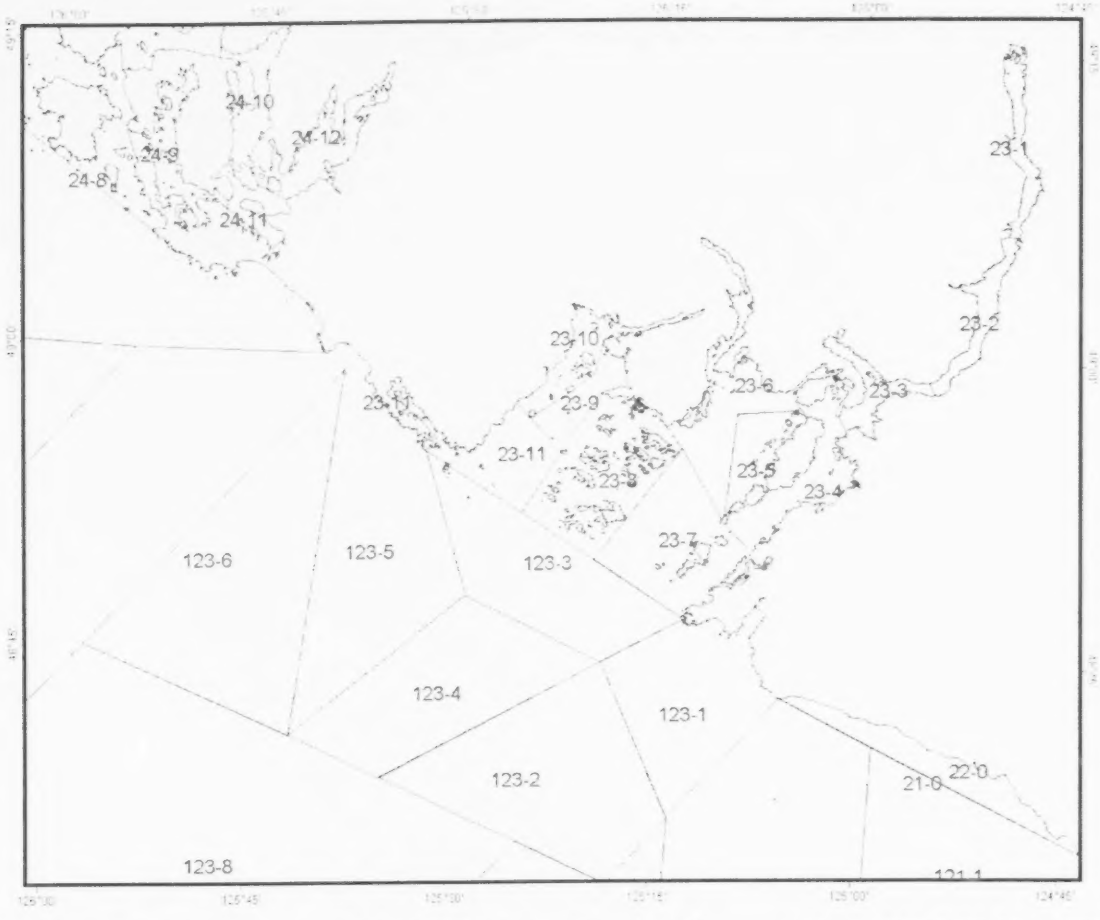

Figure 5. Subareas open for the 2003 WCVI roe herring seine fishery: portions of 23-9, 23-10 and 23-11

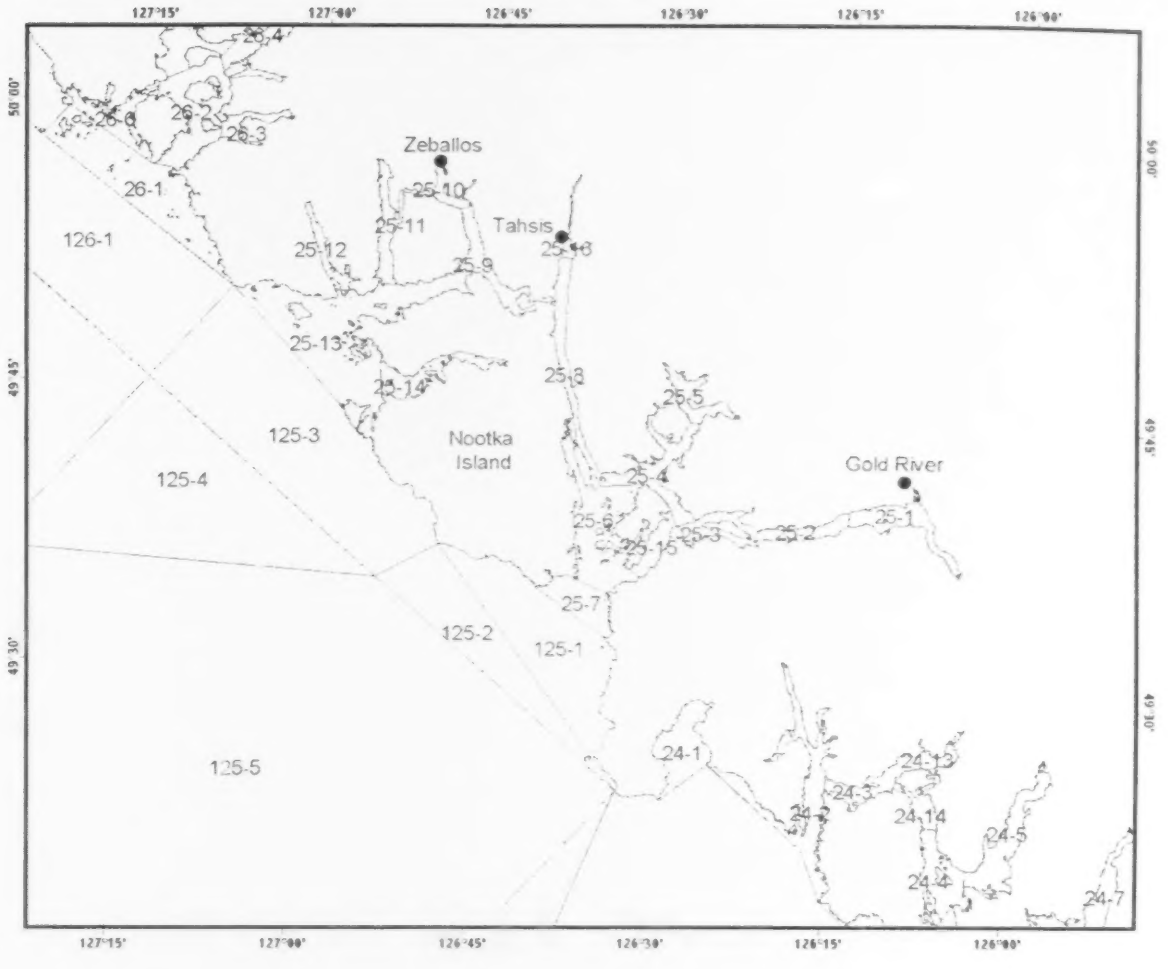

Figure 6. Subareas open for the 2003 WCVI roe herring gillnet fishery: portions of 25-13.